First Aid FOR Gunshot Wounds

First Edition

By Rick Hammesfahr, M.D.
and
Dwayne McBryde, EMT-P, USMC, USN

First Aid for Gunshot Wounds

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DISCLAIMER

WARNING: The contents of this book are not intended to be a substitute for treatment by qualified medical professionals or the functional equivalent of the training received by such professionals. If you or another person suffer injuries that require immediate medical attention, call 911 and/or seek help from qualified medical professionals as soon as possible.

For those situations where qualified medical professionals may not be available in the immediate aftermath of a gunshot wound, this book discusses various treatment techniques. A good-faith effort has been made to accurately document such techniques, but medicine is an ever-changing science and the publishers and authors cannot, and do not, guarantee the information contained herein is correct, sufficient, up-to-date, complete or appropriate for any given situation, or fit for any particular purpose.

In addition, readers of this book cannot become qualified medical professionals by studying the techniques discussed herein. Readers are therefore strongly encouraged to review the contents of this book against other sources and obtain training before attempting any of the techniques described herein.

Finally, risks of injury and even death accompany the provision of medical treatment, including the use of the book's cover or dust jacket as a chest seal or other medical treatment. The publisher and authors have no way of knowing whether the reader possesses the skill and training to safely deliver the treatment techniques described in this book. Consequently, the publisher and authors disclaim any and all liability for any injury resulting from the use of this book.

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PREFACE

FIRST AID FROM A WARFIGHTER "LEARN…SO THAT OTHERS MAY LIVE"

What happens when someone gets shot? What do you do? Is a gunfight in your living room any different than a gunfight in the streets of Baghdad? Absolutely not. The trigger is pressed, rounds go downrange, bullets impact the target. What if you or someone you love is shot? Will you be able to save his or her life, or will you stand by helplessly, not knowing what to do? We want you to be able to respond with skills and tools that give you and/or your loved ones the greatest chance to survive!

First Aid for Gunshot Wounds is the culmination of more than 15 years of experience in tactical medicine (Hammesfahr, M.D.) and 25 years of experience in emergency medicine as a firefighter, paramedic, and combat medic (McBryde). It is a simple-to-follow and understandable guidebook to aggressive first aid treatment of gunshot wounds. This is not a general first aid book. We will focus on only one condition and its corresponding first aid: the gunshot wound.

This guidebook is not an attempt to reinvent the wheel. The tools and procedures available today on the modern battlefield have vastly changed in the last few years. Further, there has been a complete mindset shift of how we treat casualties on the battlefield. Breaking out of the protocols of old is what changed levels of treatment during battle. This allowed us to drastically reduce fatalities from gunshot wounds. This book teaches the same techniques, tactics, and procedures in simple-to-understand terminology so you can respond with knowledge and skills to save a life when someone is shot.

We will begin with the basics of physiology and a bit of anatomy. This will provide you with the necessary understanding and terminology needed to not only identify underlying issues, but to speak the language needed to communicate with emergency dispatch and better inform responding EMS units.

Then we will explore the what and why of our plan to render first aid to gunshot victims. This will introduce you to a similar protocol for treating gunshot wounds that is used on the battlefield. We will then turn our attention to tools and their proper use in rendering first aid for gunshot wounds and demonstrate how to make improvised life-saving first aid tools out of household items, if necessary. Finally, using these tools, we will learn the vital skills needed to render aid for gunshot wounds to different parts of the body.

This book is a starting point and contains only the basics. It will not turn you into an EMT, combat medic, or trauma surgeon. It will, however, start your education, and we congratulate you on becoming a more educated, prepared, and responsible gun owner. There are many facilities and organizations throughout the country that offer training in the arena of tactical medicine. We recommend getting hands-on training to help broaden your knowledge and sharpen your skills. This quick reference guide does not replace, override, or contradict basic first aid training; it is intended to take your basic training to the next level and increase your preparedness to treat gunshot trauma before the professionals arrive. Learn the skills to save a life.

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ABOUT THE AUTHOR

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While Dr. Hammesfahr was working with the U.S. Special Operations Command, he was asked by the City of Marietta (Georgia) to develop a Tactical Emergency Medical Support (TEMS) unit for the SWAT team. As Medical Director for the TEMS unit, he has overseen the program development and training since its inception. With the success of that program, he has been asked to consult with other agencies in the development and training of their Tactical Medic Unit programs.

He has taught numerous courses on Tactical Medicine. His positions include:

- Medical Director, Tactical Emergency Medical Support Unit, Marietta Police/Fire Department, Marietta, Georgia. 2005-present.
- CONTOMS (Counter Narcotics and Terrorism Operational Medical Support), Faculty, 2009-present.
- Faculty/Curriculum advisor — The Tactical EMS School, 2012-present.
- Medical Director — The Tactical EMS School, 2014-present.
- Medical Director — Tactical Medical Consulting, LLC, 2013-present.
- Committee — Tactical Emergency Casualty Care (C-TECC), Board of Advisors, 2012-present.
- Board Member, United States Special Operations Command, Curriculum and Examination Board, 2003-2011, Tampa, Florida.
- Chairman, United States Special Operations Command, Curriculum and Examination Board, 2005-2011, Tampa, Florida.
- Program Chair, Special Operations Medical Association, Tactical Medical Section, 2009-2011.

ABOUT THE AUTHOR

Dwayne McBryde, EMT-P, USMC, USN

Dwayne McBryde is a veteran with more than 21 years of field experience as an emergency medical paramedic and combat medic for the U.S. Marine Corps and U.S. Navy Reserves.

As a former first-responder, he has an extensive trauma and emergency treatment background. He was a Medic and Diplomatic Security Service Contractor for the U.S. Department of State, where he provided tactical medical care for U.S. Department of State Chief of Mission personnel as a member of a low-profile diplomatic security team in a high-threat environment.

In addition, Mr. McBryde has received specialized training in Tactical Combat Casualty Care.

IMPORTANT TERMS

Airway—a passageway for air into or out of the lungs.

Arteries—blood vessels under pressure; carry blood away from the heart to vital organs.

Circulation—the movement of blood through the vessels of the body that is induced by the pumping action of the heart.

Evisceration [i-VI-se-ra-shun]—an opening in the abdominal wall due to penetrating trauma in which a portion of small or large intestines protrude outside of the body.

Hemorrhage [HEM-o-raj]—the escape of blood from a ruptured vessel.

Hemostatic Agent—a compound that accelerates blood clotting.

Hemothorax—an accumulation of blood in the chest cavity.

Hypothermia [hi-PO-ther-me-a]—when a person's core temperature dips below 95º F.

Hypovolemic Shock [hahy-poh-vuh-lee-mik]—a type of shock caused by reduced blood volume.

IFAK—Individual First Aid Kit; "blowout" kit.

Nasopharyngeal Airway [na·so·pha·RYN·geal] (NPA)—nose trumpet; a flexible rubber tube which goes through the nose and ends at base of tongue to help keep airway open.

Pneumothorax [noo-moe-THOR-aks]—collapsed lung.

Respiration—the movement of respiratory gases (such as oxygen and carbon dioxide) into and out of the lungs.

Tension Pneumothorax—the progressive buildup of air within the chest cavity.

Tourniquet [TUR-ni-ket]—a device designed to clamp down on a major artery in an extremity (arm or leg) by exerting mechanically applied pressure to surrounding tissue.

Trauma Dressing—an elastic bandage that has a flat sterile dressing pad sewn into it.

Veins—blood vessels that carry deoxygenated blood and carbon dioxide from the body back to the lungs.

CHAPTER 1

BATTLEFIELD FIRST AID FOR CIVILIANS

How Technology has Changed Battlefield First Aid

During two wars in Iraq and Afghanistan, the U.S. military faced challenges in treating battlefield casualties at a rate not witnessed since Vietnam. A byproduct of those two wars was a wealth of research and data that transformed tactical first aid and was ultimately formed into the doctrine of Tactical Combat Casualty Care (TCCC)—the standardized medical doctrine used to treat casualties across all U.S. military services. This information and doctrine shift has come at a high cost: 4,486 U.S. soldiers were killed in Iraq and more than 2,300 were killed in Afghanistan.

From 2001 to 2003 in Iraq and Afghanistan, the rate of preventable deaths was not much different than 35 years prior in Vietnam. But more than a decade later, a battlefield casualty is much more likely to survive life-threatening injuries than in past conflicts, thanks to new technology and better training.

Advances in medical technology and battlefield care are due, in part, to the duration of these conflicts. Long wars allowed information from the battlefield to be studied over longer periods of time. Information technology made it easier to track, treat, and analyze injuries. Military practices are being widely adopted in civilian hospitals, by police and first-responder paramedic teams. Institutions, such as the U.S. Army Institute for Surgical Research, have also driven a wave of research in treating traumatic injuries, for the benefit of civilians. It is time to adopt first aid principles for gunshot wounds in everyday life that reflect these advances.

The same principles of basic life-saving combat intervention also apply to non-combat injuries, such as in motor-vehicle accidents, industrial accidents, hunting accidents, and active-shooter incidents. The cause of the traumatic life-threatening condition is not relevant because the approach to successfully performing life-saving interventions is the same.

New Doctrines

In 1996, a revolutionary concept occurred in military medicine. Until then, battlefield pre-hospital trauma care followed the same guidelines that had been developed for the care of civilian trauma victims. After the Battle of Mogadishu in October 1993, the U.S. Special Operations Command conducted a study to evaluate how casualties were triaged and treated on the battlefield. The results of this study proved that civilian methods and guidelines did not work in the tactical environment. Under the guidance of Captain Frank Butler, military physicians with tactical backgrounds developed a set of protocols to increase the effectiveness of casualty care during combat operations. Those guidelines went on to become Tactical Combat Casualty Care (TCCC or T Triple C) as we know it today. Initially, these treatment protocols were taught to Special Operations Medics and Physicians. However, they were so successful that TCCC became the standard of care for all medical and non-medical military personnel.

Currently, Tactical Combat Casualty Care is taught to every warfighter in the U.S. military. Training consists of classroom learning coupled with testing and evaluating hands-on skills learned through treatment of casualties in a tactical setting. TCCC guidelines are updated two to three times a year with changes that are pushed out to the community through training and certification for proficiency in new knowledge and skill sets. Armed with this knowledge and a specialized combat first aid kit known as an IFAK (Individual First Aid Kit), the modern-day warfighter has made a significant difference on the battlefield with respect to survivability. Specifically, mortality rates have been significantly reduced by initiating rapid first aid treatment in the form of hemorrhage control.

The backbone of rapid effective response is self-aid or buddy-aid before a medic arrives. Self-aid and buddy-aid care are equally applicable in civilian life for keeping yourself or someone else alive until EMS gets there. This is the goal we will attempt to achieve with the skills taught in this book.

Prior to the introduction of TCCC, general first aid principles taught to civilian paramedics were being applied in the combat environment. However, the operational environment of the military is radically different from that in the civilian world. The principles of military medical care must consider operating conditions, such as incoming hostile gunfire, darkness and light restriction, minimal medical supplies, weather, hazardous and prolonged evacuation times, and temperature extremes, to name several examples. As a result, guidelines were developed that considered these hazardous operating factors.

Tactical Combat Casualty Care was conceived around a three-phase system of medical care. As the danger to the victim and medical provider decreases, the amount of medical care and the complexity of medical care that can be provided increases.

The Committee on Tactical Emergency Casualty Care (TECC) based the civilian guidelines on the principles of TCCC. The military TCCC guidelines were modified in recognition of the fact that the civilian population was different from the military population with respect to age, gender, fitness, and general health. As a result, the TECC guidelines were developed.

The phases of TCCC are Care Under Fire, Tactical Field Care, and Tactical Evacuation. The phases of TECC are Direct Threat, Indirect Threat, and Evacuation.

Care Under Fire (Direct Threat) represents the most dangerous phase because any medical care being provided is in the presence of incoming hostile gunfire. There is a Direct Threat of further injury. As a result, the potential for further injury and more casualties is high, and the level of medical intervention must be extremely limited.

Tactical Field Care (Indirect Threat) occurs when there is no longer incoming effective hostile gunfire and the probability of sustaining additional casualties and injury is much lower. Hence, the level of medical care is more advanced because the operating environment is safer.

The final phase, Tactical Evacuation (Evacuation), is the safest, allowing for advanced medical procedures to be performed while the casualty is en route to a field hospital. By recognizing the different levels of danger, it becomes possible to apply the proper medical techniques at the proper time.

The correct medical procedure applied at the wrong time leads to increased mortality and injury. However, the correct technique at the correct time allows for increased survivability. The lessons learned in combat are just as appropriate in aiding victims of gunshot wounds, motor-vehicle accidents, or industrial accidents.

Critical Care Acronyms: Letters to Memorize

Critical care in an emergency situation can be overwhelming and unnerving. This is always true when you or someone you know or love is shot. However, this is the time to remain calm and rely on your training. To bring order out of chaos, several acronyms have been developed to assist in remembering the proper steps in emergency care.

In the civilian treatment world, the acronym CAB (Circulation—Airway—Breathing) has been promoted as the proper approach in CPR. However, the vast majority of cases involving CPR **DO NOT** involve blood loss. Gunshots and other traumatic wounds that result in blood loss need to be approached differently. After all, it does no good to pump the chest (give CPR) if the patient is losing blood on the ground. It does not matter how effective the chest compressions are if there is no blood to carry the oxygen. As a result, a radical new common-sense approach was developed by the military. It focuses on the importance of stopping the bleeding first. The initial military acronym was MARCH (Massive Hemorrhage, Airway, Respiration, Circulation, Hypothermia). Several other acronyms have been used including MARCHH or MARCH2 (Massive Hemorrhage, Airway, Respiration, Circulation, Hypothermia, Head Injury), or WEMARCH (Weapons, Explosives, Massive Hemorrhage, Airway, Respiration, Circulation, Hypothermia), to name a few. The basic building block is MARCH with individual variations as necessary to remember things during times of stress and unusual situations.

In this book, we will be using a modified version of the military's MARCH. Why have we revised it? Well, to stress the realities of civilian life. For example, a corpsman or a medic does not need to be reminded they are in a combat setting.

However, a civilian needs to think in terms of continuing criminal threats and identifying additional threats, such as an "active shooter" or other wrongdoers. Therefore, our treatment plan for dealing with a gunshot victim always begins with safety and security. Thus, we introduce **S.M.A.R.C.H.R.**™: Steps to treating gunshot wounds.

S.M.A.R.C.H.R.™

STEPS TO TREATING GUNSHOT WOUNDS

What do you do when someone is shot? This acronym of treatment steps can help you remember.

(S) Safety and Security. Pause, make sure the scene is safe, free of active criminal threats, and all weapons have been made safe or holstered. Activate EMS by calling 911. When the scene is safe, then begin to evaluate and render first aid to the victim.

(M) Massive Hemorrhage Control. If you have a gunshot wound with bright-red squirting or pooling blood, you have a massive arterial hemorrhage. You must start there. If you don't control massive arterial hemorrhages, the victim can die in minutes.

(A) Airway. Your next step is to make sure your victim has an open airway. If victims can't get air into their lungs, they cannot breathe and they will die.

(R) Respirations. Breathe, baby, breathe. Are there any leaks in the chest? Assess the quality of breathing and seal any leaks in the system caused by a bullet or other penetrating object (knife, shrapnel, etc.). This is done with chest seals. The victim must then be monitored for a life-threatening condition known as a tension pneumothorax, as discussed in Chapter 2. If it develops, it must be treated immediately by a trained professional.

(C) Circulation. This is an assessment of blood movement through the body (circulation) by using pulse points and watching for shock caused by blood loss. There is little that the non-medically-trained person can do for this issue. However, this is the time to identify and treat other bleeding wounds that do not represent massive arterial hemorrhages, but that are still contributing to blood loss. Now is the time to bandage those wounds and preserve blood for the circulatory system.

(H) Hypothermia. Blood loss can quickly cause hypothermia, for reasons discussed in Chapter 2. Even in hot summer weather, significant blood loss may result in hypothermia.

(R) Recovery and Reassess. Put the unconscious victim in the Recovery Position (as described in Chapter 3), if not already done so in the Airway phase. This position will minimize the risk of airway blockage from blood, vomit, or a flaccid tongue until EMS arrives.

Reassess the victim often until EMS or definitive care arrives. When a patient has sustained a life-threatening wound, his or her condition will change with time. Only by constant reassessment and re-evaluation can these changes be identified and addressed. The best way to reassess a patient is to repeat **S.M.A.R.C.H.R.**™ and check your treatments.

Following the steps in the **S.M.A.R.C.H.R.**™ procedure may be the difference between life and death for a gunshot-wound victim in the field. Rapidly controlling significant bleeding by providing hemorrhage control and airway support may give the victim of a gunshot wound the time needed to survive until professional medical care arrives.

As physicians and medics, we live by the credo, “Do No Harm,” which does NOT mean stand by and do nothing. Educate and train yourself, and you will be prepared to offer real help and first aid and do the right thing when seconds count. Let’s continue our journey by looking at the anatomy and physiology of the human body every gun owner needs to know.

CHAPTER 2

BASIC PHYSIOLOGY AND ANATOMY

Remember, the goal of first aid for gunshot wounds is to buy time to get a victim to a higher level of care. In medical emergencies, First Care Providers—laypeople who have been trained in basic techniques to manage traumatic injury—can provide life-saving interventions in the critical moments following an accident or incident. Part of buying time is understanding exactly what to do and why. To accomplish this, it is essential to understand the basics of human physiology and anatomy.

What is Physiology?

Well, it can be defined as the science that deals with the mechanisms and processes that keep us alive. It is very useful for a First Care Provider who wishes to help a gunshot victim (potentially yourself or someone you care about) to understand some basic concepts of what is happening in the body and how to prevent the breakdown of vital body processes. We will only scratch the surface of a very broad subject. However, basic knowledge is essential for understanding what type of injury you are dealing with during a crisis and what first aid to administer.

CIRCULATORY SYSTEM BASICS: MOVING THE BLOOD

With gunshot wounds, there is always some degree of bleeding, so we will start with the circulatory system. Also known as the cardiovascular system, it consists of the heart and blood vessels that are responsible for circulating blood in the body. In the average human, about 2,000 gallons (7,500 liters) of blood travel daily through about 60,000 miles of blood vessels. The average adult has 5 to 6 liters of blood. Blood is made up of plasma, red blood cells, white blood cells, and platelets.

As the blood moves, it transports material necessary for life (nutrients, oxygen, and hormones) and removes the waste byproducts (carbon dioxide, lactic acid, etc.). It also maintains, carries, and circulates warmth throughout the body. Without a functioning circulatory system, the cells that make up the body soon start to die. Circulation also allows the body to fight disease and to maintain a stable internal environment, such as proper acid/base balance.

At the core of the human circulatory system is the heart. The heart is a hollow, muscular pump about the size of a fist. It is enclosed in a tough, fibrous sac called the pericardium and is protected by the rib cage. The entire purpose of the heart is to pump and circulate blood throughout the body. The average heart beats 60 to 100 times per minute. If a victim has a massive arterial bleed, the heart will be beating at a minimum of 100 times per minute and, in reality, probably much faster at 150 beats per minute. As the amount of blood lost increases, the heart rate also increases. A gunshot wound that severs a major artery can cause death in fewer than three minutes. You need to be prepared to identify the problems and render first aid.

What are Arteries and Veins?

Arteries and veins are the two major types of blood vessels in the body. Arteries are the blood vessels that are under pressure and are tasked with carrying blood away from the heart and delivering it to vital organs. Arterial blood has passed through the lungs, carries oxygen, and is bright red. If you have a massive arterial bleed from a gunshot, you will have bright-red, pulsating or pooling blood. Emergency!

Veins are also blood vessels. Generally, veins carry deoxygenated blood and carbon dioxide from the body back to the lungs so that carbon dioxide may be removed as the blood is reoxygenated before returning to the heart and the rest of the body. Veins are generally under much less pressure than arteries. Blood from a venous bleed will be much darker red (reflecting the lower oxygen content) and will ooze, rather than squirt. A large vein injury still may cause profuse bleeding, but it will not pulsate in the manner of an arterial bleed.

Major Arterial Bleeding: Enemy Number One

The first concern in a gunshot wound will be blood loss—blood escaping from the circulatory system.

As stated, the average person only has 5 to 6 liters of blood (Figure 2.1) in the body, approximately 7% of his total body weight. Since a major arterial bleed can drain

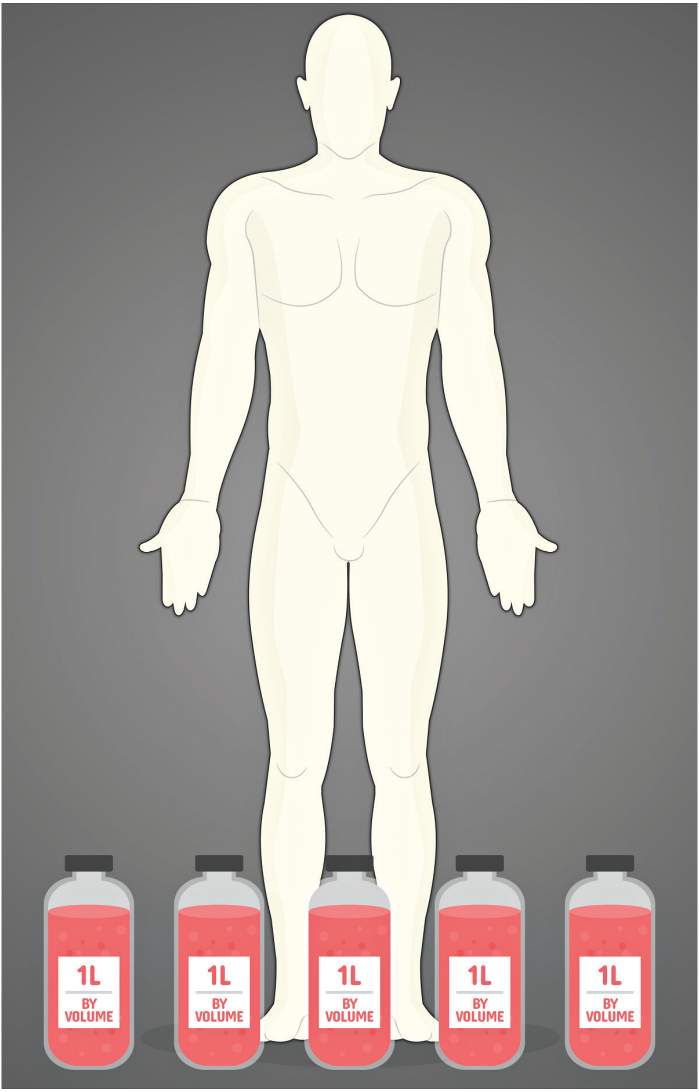


Figure 2.1: Average human blood volume.

a liter of blood in a matter of seconds, it is crucial to stop bleeding quickly.

To put this into perspective, with each heartbeat, the average amount of blood pumped from the heart into the arterial system is 70 cc. The average resting heart rate is 70 to 75 beats per minute. This means that between 4,900 and 5,250 cc are pumped through the heart and circulatory system each minute. With major blood-vessel injury and trauma, the heart rate increases. With stress or injury, the heart rate can easily increase to 100 beats per minute (or even higher). With a heart rate of 100 beats per minute, approximately 7,000 cc are pumped through the body each minute. A major arterial injury results in a very rapid loss of blood, the rapid onset of shock, and subsequent death. Remember that the body only has 5,000 to 6,000 cc (5 to 6 liters) of blood normally. Therefore, massive hemorrhage control is always the first priority—the M in **S.M.A.R.C.H.R.**™

THE START OF STOPPING THE BLEED

Pressure Points: Crimp the Hose

If you have a massive arterial hemorrhage squirting blood, you want to slow down the bleeding as quickly as possible. As explained earlier, blood vessels are the pipes that carry the blood in the body. Just like a water hose, these blood vessels may be constricted, or "crimped," to slow down or stop the blood flow to the affected area. Even before you can get any medical device ready to stop the bleeding, it is possible to slow the blood loss by applying direct pressure with a hand (preferably gloved) or a knee to the wound or the appropriate pressure point on the victim. The best place to attempt to slow down the movement of blood to the affected area is at one of the body's pressure points upstream (between the heart and the wound) from the bleed.

What is a Pressure Point?

A pressure point is a location on the body where an artery is located between the skin and a bony surface, such as the femur (long bone in the thigh). Pressure points are sensitive to the touch and can be quite painful with the application of blunt force. These points give you the best opportunity to slow bleeding by applying direct pressure to decrease circulation of blood to the wound. There are numerous points all over the body (Figure 2.2).

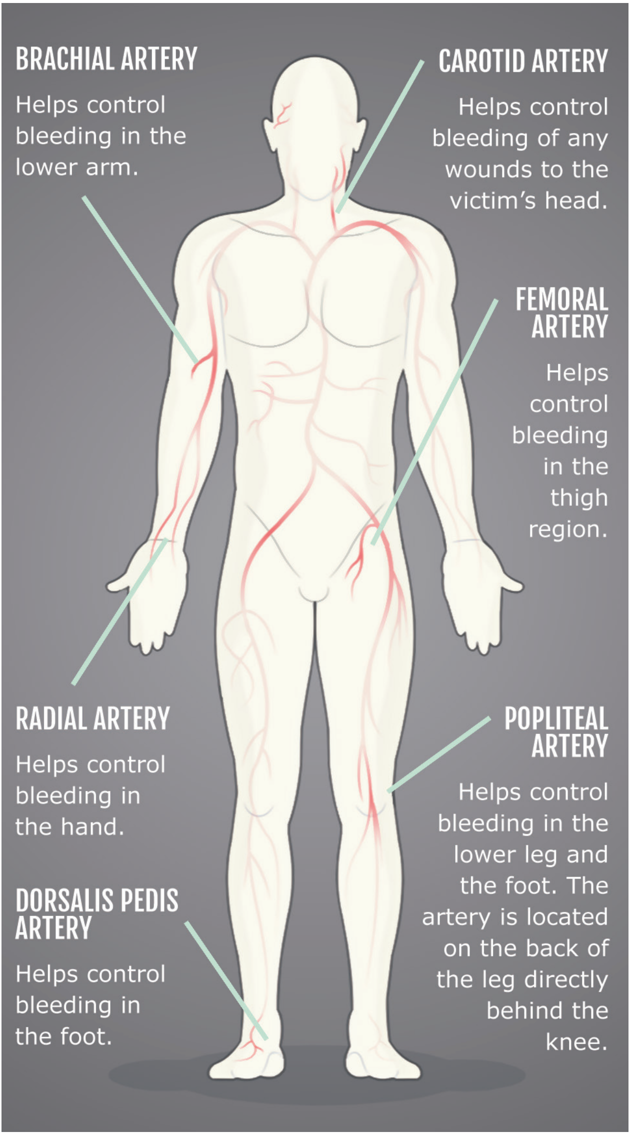

BRACHIAL ARTERY
Helps control bleeding in the lower arm.
CAROTID ARTERY
Helps control bleeding of any wounds to the victim's head.
FEMORAL ARTERY
Helps control bleeding in the thigh region.
RADIAL ARTERY
Helps control bleeding in the hand.
POPLITEAL ARTERY
Helps control bleeding in the lower leg and the foot. The artery is located on the back of the leg directly behind the knee.
DORSALIS PEDIS ARTERY
Helps control bleeding in the foot.

Figure 2.2: Pressure points.

If you have a major arterial bleed, locate the pressure point closest to the wound that is upstream or closer to the heart, and apply direct pressure with a knee or the palm of the hand. At best, you can only hope to slow most massive arterial bleeds with direct pressure at a pressure point until a tourniquet, hemostatic agent, or packing material is applied. When applying direct pressure, whether it be at the wound or at a pressure point, put your entire body weight behind the effort! You must apply enough pressure to compress the muscles surrounding the major blood vessels. Remember, the goal is to minimize blood loss until the proper intervention is in place.

The femoral artery at the groin is the pressure point most likely to be used for the leg, and the brachial artery at the mid upper arm is the most commonly used pressure point for the arm (Figure 2.2).

Pulse Sites and Determining Blood Pressure

There are certain places on the body, called pulse sites, where it is possible to feel a person’s pulse. By feeling the pulse, you can gain a general idea of how the victim is doing. This is helpful in evaluating how much blood a person has lost and/or what is the imminent threat of hypovolemic shock from blood loss. Generally, the greater the blood loss, the lower the blood pressure. If you do not feel a pulse at a pulse site on a victim, the blood pressure is so low that a pulse is not present at that site.

What is a Pulse?

A pulse is simply a pressure wave initiated by the heart that expands the arteries. When the wave of blood reaches the pulse point, it may be felt. The pulse may be detected in any place where an artery is close enough to the skin’s surface to be felt.

There are nine primary pulse sites on the human body. The three most important pulse sites for first aid purposes are the radial, femoral, and carotid arteries, in that order. Why? Because the presence of a perceivable pulse at these sites will provide a basic understanding of the person’s systolic blood pressure.

There are two numbers associated with a blood pressure—the systolic and the diastolic pressures. The systolic pressure is the upper figure and the diastolic number is the lower. For example, if the blood pressure is measured at 120/70, 120 mmHg is the systolic pressure and the 70 mmHg is the diastolic pressure. When feeling the pulse, the systolic pressure causes the pulsations. As the systolic pressure decreases, the pulse becomes more difficult to feel.

A palpable radial pulse at the wrist indicates that the victim's systolic blood pressure is at least 80 mmHg. This pressure is much lower than the normal systolic pressure of 120 mmHg, but it still supports life.

If there is not a palpable radial pulse, but there is a palpable femoral pulse, this means that the victim's systolic blood pressure is approximately 70 mmHg, significantly lower than the normal pressure, and indicates the presence of shock.

If the only palpable pulse is at the carotid artery in the neck, then the victim's systolic pressure is about 60 mmHg (Figure 2.3). This is dangerously low and indicative of a probable fatal outcome if not rapidly treated and corrected. If you cannot feel a pulse at a pulse site, then the person's systolic blood pressure is below that indicated for each point, and the victim may be slipping into or is already suffering hypovolemic shock from blood loss, as discussed later.

When feeling for the pulse, the radial artery on the uninjured arm is checked first because the blood supply has not been damaged and a tourniquet has not been applied. The pressure is highest at the radial artery when compared to the femoral and carotid arteries. If nothing is felt, then the femoral and carotid arteries are checked in that order. Not only is the presence or absence of the pulse important, but the quality is just as important. The "quality" of a pulse refers to whether the pulse is fast or slow, and whether it is strong or weak.

Healthy patients tend to have a strong pulse that is easily felt (palpated) and a pulse rhythm that is very regular, usually around 70 beats/minute. When a person loses blood, the pulse initially quickens because the heart pumps more rapidly to compensate for the loss of blood.

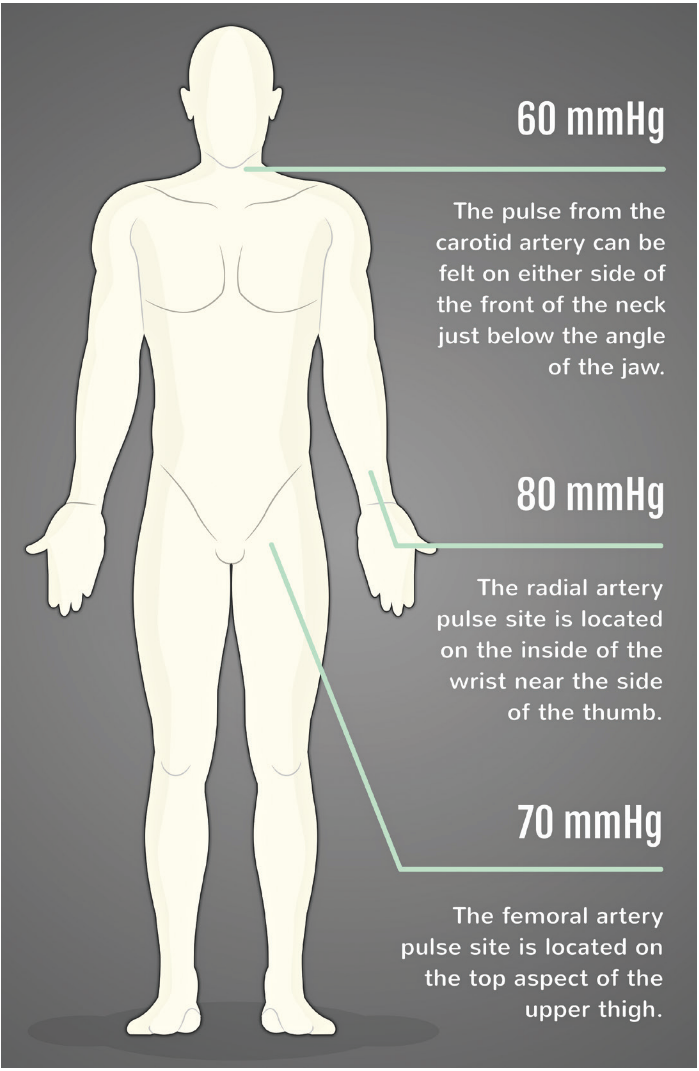

60 mmHg
The pulse from the carotid artery can be felt on either side of the front of the neck just below the angle of the jaw.
80 mmHg
The radial artery pulse site is located on the inside of the wrist near the side of the thumb.
70 mmHg
The femoral artery pulse site is located on the top aspect of the upper thigh.

Figure 2.3: Minimum systolic blood pressure if a pulse is detected.

Then as the blood pressure starts to decrease from loss of blood, the pulse becomes weak and more difficult to feel. If the blood loss continues, the pressure decreases further. At this point, the pulse at the radial artery (which is indicative of the highest palpable systolic pressure of all the pulse points), which had been rapid, weak, and difficult to feel, now disappears. However, it may still be possible to feel the pulse at the femoral artery. With this information, you would know that the victim has no pulse at the radial artery, a weak and rapid pulse at the femoral artery, and you would realize that the victim has had a major loss of blood and is slipping into shock.

How Can You Tell if You Feel a Pulse?

A pulse presents a tactile indication of the heartbeat to the observer's fingertips. The heart rate can also be measured by listening to the heart directly by placing your ear on the chest if you do not have a stethoscope or know how to use one.

CIRCULATORY SYSTEM: THE ENEMY IS HYPOVOLEMIC SHOCK!

What is Hypovolemic Shock?

If a person is experiencing major blood loss, he or she can be dead in fewer than three minutes. Fine motor skills rapidly diminish in 45 to 60 seconds. This means that the muscles begin to have difficulty responding to signals from the brain. Severe blood loss makes it impossible for the heart to pump a sufficient amount of blood to the body. Initially, the heart will beat faster in an effort to pump available blood. Once deprived of blood circulation, organs begin to shut down and organ failure begins. The cells in the body start to die! This condition requires immediate emergency medical attention and will always be a major concern with a gunshot wound, so it will be repeatedly stressed. You must attempt to stop massive bleeding as the first life-saving intervention.

Shock is the condition when cells in the body start to die from lack of oxygen. The lack of oxygen may be from inadequate airflow, contaminated air (carbon monoxide or other gases), or decreased blood flow throughout the body. For whatever reason, there is an inability to provide enough oxygen to the body's cells to maintain the functioning of that cell (or organ) at a level compatible with life.

In the case of a gunshot wound to the body, absent accompanying environmental concerns, shock is caused by the loss of blood. This is called hypovolemic shock. This is a life-threatening condition caused by inadequate blood flow. When a person loses as little as 15 to 30 percent of their blood volume, they have already entered Class II Hemorrhagic Shock. This means that there is inadequate blood flow to the cells. As a result, there is a reduced flow of life-sustaining oxygen and nutrients and a buildup of toxic metabolic byproducts due to the reduced blood circulation. When this happens, the cells start to die and organs (heart, lung, kidney, brain) begin to fail.

Blood also supplies warmth to the body. Blood loss will contribute to immediate decrease in core temperature. The greater the blood loss, the greater the risk of hypothermia. Even on a 90º F (Fahrenheit) sunny day, the loss of blood can induce hypothermia.

Hypothermia is generally defined as when a person's core temperature dips below 95º F. A person's normal temperature is approximately 98.6º F.

When hypothermia occurs, not only does the body temperature decrease (which affects the functioning of organs), but the ability of the blood to clot also decreases. This is a terrible situation because the increased blood loss has:

- Decreased oxygen delivery and impaired organ functioning
- Decreased core body temperature (hypothermia)
- Decreased ability of blood to clot (coagulopathy)
- A metabolic imbalance called acidosis

The combination of hypothermia, acidosis, and coagulopathy is known as the "Lethal Triad" due to the high mortality rate.

What are the Signs of Hypothermia?

The signs of hypothermia change as the duration of hypothermia increases and the body temperature decreases. Initially, as the body temperature decreases, shivering, increased heart rate, and increased respiration occur as the body attempts to maintain circulation and warmth to the vital organs. With a further drop in the body temperature, brain function begins to slow down, along with the cardiac and respiratory rates. Shivering, which produces body heat, eventually stops as the metabolic energy stores of the body are depleted. A vicious cycle then develops as the heart rate decreases. The oxygen and energy stores then decrease and cannot be replenished due to the lack of oxygen and the decreased circulation, which in turn allows for further cooling and a further decrease in the heart rate and the amount of blood circulation, and so forth. In addition to the changes in the metabolic processes of the body (decreased heart rate, respiratory rate, and organ function), the lowered body temperature interferes with the ability of the blood to clot. This, in turn, allows for further blood loss and a continued cycle of events that is incompatible with life.

AIRWAY

Gunshot Wound to the Chest

We are all familiar with breathing, and a gunshot to the chest will quickly remind everyone about the value of breathing. A bullet to the chest has a very high likelihood of putting a hole in your respiratory system. Even if a person initially survives a gunshot wound to the chest, they will still have damage to their respiratory system.

When a bullet breaches this system, it can be catastrophic. The major enemies are collapsed lungs and complications from unwanted leaks in the system, such as a pneumothorax.

What is a Pneumothorax?

The respiratory system is a series of organs responsible for taking in oxygen and expelling carbon dioxide is the respiratory system. The respiratory system is responsible for our body's most important physiological process—breathing. The nose, trachea ("windpipe"), and lungs make up the respiratory system (Figure 2.4).

As the lungs expand and contract, they supply life-sustaining oxygen to the body and remove a waste called carbon dioxide.

The chest wall consists of the ribs, muscles, and skin. Inside the chest wall are the lungs and heart. When a person takes a deep breath, the chest wall expands. This creates a temporary space between the inner chest wall and the outer surface of the lungs called the pleural cavity. The negative pressure in this cavity causes the lungs (which have a higher pressure) to expand in the pleural cavity space. As they expand, air is brought through the trachea and into the lungs. When exhalation occurs, the expanded chest wall relaxes, compressing the lungs and causing air to be expelled. This process is known as breathing.

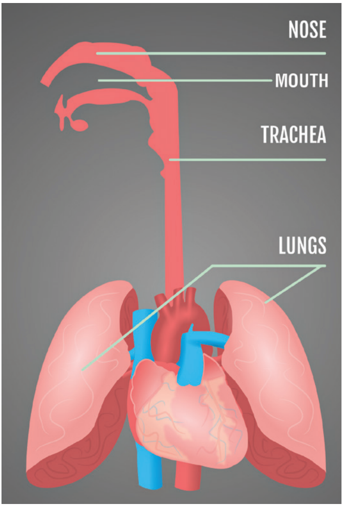


Figure 2.4: The Respiratory System.

Normally, the pleural cavity does not have any air in it. A pneumothorax occurs when air enters this space. Air in the pleural cavity changes the necessary pressure relationships, making it difficult to breathe.

The terminology of lung injuries can be confusing. A pneumothorax occurs with any condition that allows air to enter the pleural cavity. The unwanted pocket of air is a pneumothorax (Figure 2.5). A pneumothorax may occur with any of the following situations:

- The outer chest wall is penetrated, the lung is uninjured, and air enters the pleural cavity;
- The outer chest wall is penetrated, the lung is penetrated, and air enters the pleural cavity—this is a “sucking chest wound” or open pneumothorax;
- The outer chest wall remains intact, the lung is injured, and there is an air leak from the lungs into the pleural cavity—this is called a closed pneumothorax. For example, blunt trauma causes a rib to fracture and be pushed into the lung, tearing it. The chest wall is intact, but there is air leaking from the lung into the pleural cavity, interfering with normal breathing.

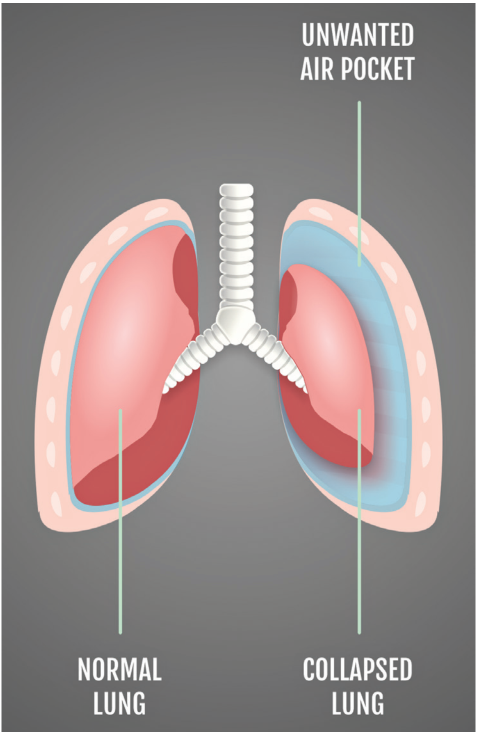


Figure 2.5: A Pneumothorax.

What is a Sucking Chest Wound?

Imagine a bullet being fired into the chest. The bullet will pass through the skin, ribs, and the pleural space before entering the lungs. The pleural space is the area or cavity outside of the lungs in which the lungs inflate and deflate during breathing.

If a bullet or debris from a gunshot pierces the pleural space and enters the lungs, there is now a hole in the system. When a gunshot wound has pierced the lung, the victim continues to breathe in air through the mouth and trachea. At the same time, air will be sucked in through the hole in the chest. Similarly, when the victim breathes out, the air will be forced out, not only through the trachea and mouth, but also through the hole in the chest. This is a sucking chest wound. The movement of air in and out of the chest and, especially through the hole in the chest, causes a gurgling sound. This type of wound makes it difficult to breathe and decreases the amount of oxygen getting transferred into the blood because the air is escaping from the lung through the chest wall and into the outside air rather than staying in the lungs.

Any hole in the respiratory system presents challenges for First Care Providers. Because the respiratory system is closed and self-contained, the initial step in rendering first aid is to seal the holes using effective chest seals (See Chapter 3.) Until the air system is resealed, any other actions will likely be in vain. But sealing the wounds is only the beginning. So, get the wound sealed and watch for the victim's next enemy—a tension pneumothorax.

What is a Tension Pneumothorax?

A tension pneumothorax is a pneumothorax (unwanted air pocket in the pleural space) that has grown to such a degree as to put pressure on the lungs, heart, or other organs. This build-up of air is like inflating a balloon that is pressing against the lung and will not allow the lung to re-inflate. The air pocket pushes on the affected lung and causes it to collapse more and more as the unwanted air pocket grows. This leads to a collapsed lung, decreased blood flow in the lungs, decreased oxygen in the blood, decreased cardiac output, and increased probability of death.

As discussed earlier, the correct life-saving first aid to a gunshot wound to the chest is to seal the chest wound. This will improve breathing and lung function. However, some victims will develop a tension pneumothorax as a result of sealing the chest wound. This occurs because by sealing an open pneumothorax (chest wall wound) you are trapping air inside the respiratory system, however, this also means that the victim's own breathing will force air into the pleural space. This will increase the pressure in the unwanted air pocket causing a tension pneumothorax. There are several ways to render first aid to a victim that develops a tension pneumothorax. These include using a vented chest seal and "burping" the chest seal (See Chapters 3 and 5).

What is a Hemothorax?

A hemothorax occurs when the victim has an accumulation of blood in the pleural space. However, a hemothorax is even more severe than the air-based pneumothorax because of the massive amount of internal bleeding possible. This is now a respiratory **AND** circulatory compromise due to the diminished lung function, the decreased pumping ability of the heart (cardiac output), and the continuing blood loss. A hemothorax can only be fixed with a chest tube. This is a procedure that is beyond the scope of this first aid book. Continue other first aid procedures and wait for professional help to arrive.

A BIT OF ANATOMY

Dividing the Torso

The torso is divided by the diaphragm, which is a large muscle that is at the bottom of the lung cavity and divides the torso in half to separate the chest (top of torso) from the abdomen (bottom of torso). Picture the diaphragm as a bellows that a blacksmith uses to stoke his fire. As the diaphragm contracts and relaxes, it controls the breathing in a person.

Simply look down right now, as your chest wall expands and contracts, you will see the results of your diaphragm working to produce respiration. Any gunshot to the torso will be classified as a chest wound, an abdominal wound, or possibly both, depending on the path the projectile took. A projectile can penetrate the abdominal region of the torso and deflect upward, penetrating the diaphragm, and end up piercing a lung, creating a tension pneumothorax. In this case, you could find yourself sealing a chest wound in the abdominal region. Therefore, you must be aware of the possibility of respiratory difficulty and a tension pneumothorax developing, even in the absence of an obvious penetrating injury of the chest wall.

As discussed later, we never pack a gunshot wound or any penetrating trauma to the chest, because it could be a fatal mistake. For the purposes of gunshot-wound first aid, treat any wound that is just below the rib cage and above the pelvis as an abdominal wound. Any wound from the bottom of the rib cage to the base of the neck is considered a chest wound.

Dividing the Abdomen

The abdomen is divided into four equal quadrants. These quadrants are used as landmarks to determine which body organs lie beneath each quadrant (Figure 2.6). The first concerns for any gunshot wounds to the Right Upper Quadrant and the Left Upper Quadrant are the solid organs contained there, including the liver. The liver is a large solid organ that bleeds profusely if damaged. The spleen is in the Left Upper Quadrant and is another solid organ that bleeds heavily if damaged. Solid organs do not tolerate the kinetic energy of a projectile well. Solid organs bleed profusely, while hollow organs, such as the stomach, bladder, and intestines, don’t. But the guts, as they’re called generically, can leak body fluids and fecal material into the abdominal cavity, increasing the risks of a potentially fatal infection.

Abdominal wounds generally fall into three categories, or a combination of these categories:

1. The superficial abdominal wound penetrates the skin and muscle, but does not enter the abdominal (peritoneal) cavity, such as a superficial knife slash.
2. A wound that penetrates into the abdominal cavity, but does not expose any organs and does not allow the internal organs to protrude from the abdomen.
3. A wound that penetrates into the abdomen and allows the internal organs to fall out of the abdomen and be exposed to the air. This third group is called an evisceration (Figure 2.7).

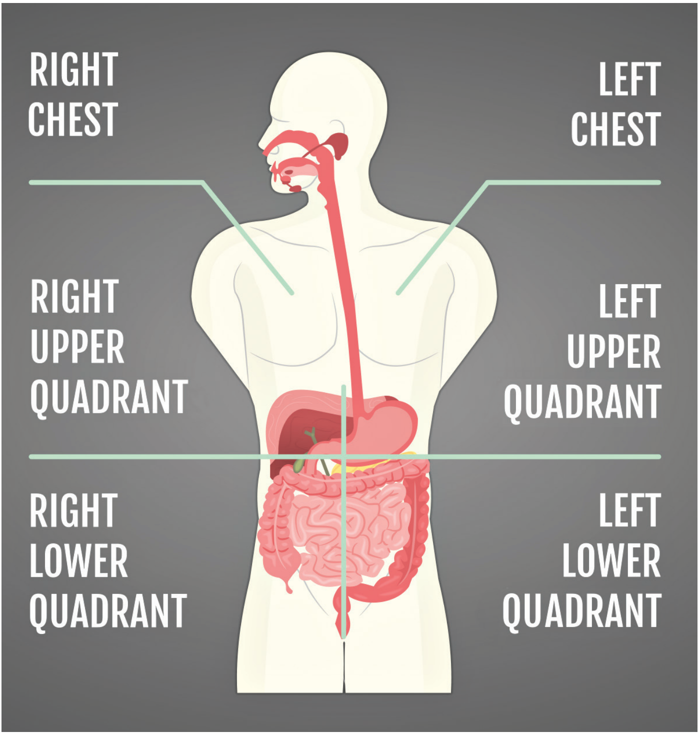


Figure 2.6: Abdominal Quadrants.

With penetrating abdominal wounds, there is the potential for the abdominal contents to protrude outside of the body. This abdominal injury is called an evisceration.

What is an Evisceration?

An opening in the abdominal wall due to penetrating trauma can open a pathway that allows a portion of the small or large intestines to protrude outside of the body. This injury looks terrible and can distract the First Care Provider from more serious wounds, such as a major hemorrhage or major airway compromise. Although any wound that is inflicted on the body should be considered dangerous, an evisceration is not an immediate life-threatening condition. We will discuss first aid for this in Chapters 3 to 5.

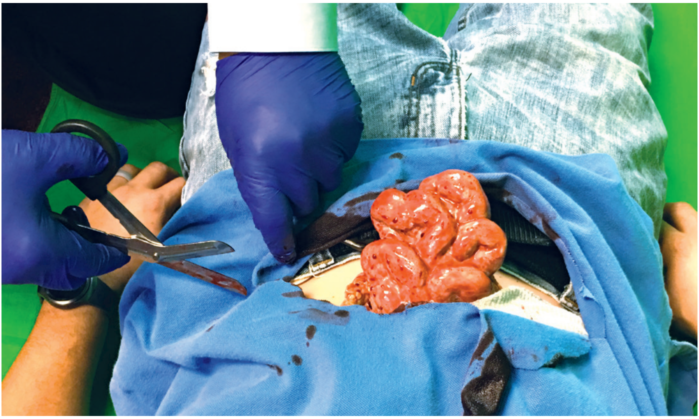


Figure 2.7: Evisceration.

What is the Groin?

In human anatomy, the groin is the junctional area between the abdomen and the thigh on either side of the pubic bone. Because of the growing use of body armor that protects the chest and abdomen, groin injuries are becoming more common because the top of the thigh is often exposed to allow for better mobility. Of course, that makes the area vulnerable as well. Shots to the groin, and

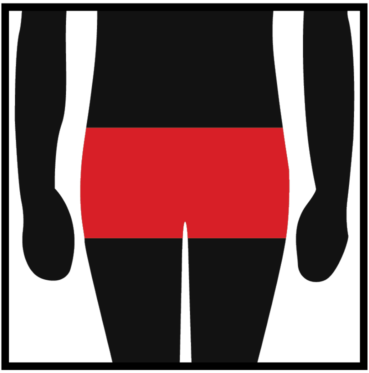


Figure 2.8: Groin area.

more broadly, the pelvic area in front and back, can stop the victim from staying upright. Also, there are large blood vessels throughout the groin and pelvic area (the lower part of the trunk between the abdomen and the thighs) that can cause major bleeding. As we will discuss later, these wounds must be packed to stop bleeding. A tourniquet physically won't work.

CHAPTER 3

A PLAN TO HELP A GUNSHOT-WOUND VICTIM: S.M.A.R.C.H.R.™

Number One Goal: Buy Time

As avid believers in the rights guaranteed to all of us by the Second Amendment, our goal is to make everyone who reads this book a more responsible, educated, and prepared gun owner who can respond in a time of need with life-saving first aid skills. As mentioned earlier, we use a guide based on the plan widely used in military tactical medicine (TCCC) and civilian Active Shooter Incidents (TECC).

Our plan for gunshot first aid uses the acronym S.M.A.R.C.H.R.™ It is an easy-to-remember word tool that will teach you what to do, step-by-step, if you encounter a gunshot-wound victim in need of immediate first aid. If you follow these procedures, in order, you should be able to identify life-threatening injuries, address them in appropriate order with the correct First Care Provider skills, and help the victim survive until professional help arrives.

What and Why

This chapter will give you the what and why of each of the components of the S.M.A.R.C.H.R.™ road map. In Chapter 2, we discussed what happens in a victim's body after a gunshot wound. In this chapter, we will discuss the reasoning for each first aid step of the S.M.A.R.C.H.R.™ road map to treating a gunshot wound. In Chapter 4, we will discuss the tools and skills required to properly administer first aid. With this background knowledge, by the end of Chapter 4 you will know what to do, how to aid a gunshot victim, and why you are doing each specific skill.

Survivability: Wound Placement

Survivability of a gunshot wound depends on many factors. First is the location of the wound. This is critical because it determines the underlying tissue and organs that are destroyed or damaged. Solid organs and hollow organs react differently when shot. Solid organs bleed profusely. Hollow organs (bladder, stomach, intestines) bleed, although to a much lesser degree, and leak fluid (bile, urine, GI tract contents).

Trauma victims may be broadly grouped into three classes:

1. Those who will die no matter what you do. There are gunshot wounds that you are not going to be able to do much for, and that is a fact you need to face and prepare for right now. Not all victims can be saved.
2. Those who will survive no matter what you do.
3. Those who will survive with the proper medical care.

It is this third group that is most important to us. Being shot is not an automatic death sentence. When major organs, such as the heart, brain, and main arteries are avoided, the chances of survival are good. The catch, of course, is that there is no science to preventing a bullet from hitting a vital part of the body.

Examples:

- A man in North Carolina was shot 20 times in 1995 and lived to tell about it.
- The rapper 50 Cent was shot nine times in 2000, lived, and has since released numerous albums.
- In 2006, civilian Joseph Guzman survived 16 to 19 gunshot wounds during a standoff with New York police that killed his friend Sean Bell. Bell was shot only four times, but did not survive because two of those shots hit vital organs.

In all too many incidents, gunshot victims become fatalities because no one is trained or equipped in first aid treatment for a gunshot wound. Bystanders try to help, but unless they know what to do, the victim bleeds out while people watch helplessly. This doesn’t have to happen to you.

Survivability: Timely Aid

After wound placement, survivability depends on timely response of trained personnel with proper equipment. Unfortunately, when seconds count, response times for most police and EMS units will still be several minutes away—time that a gunshot victim does not have. Fire and EMS may even be delayed due to the nature of the incident. EMS typically does not enter a crime scene until law enforcement arrives and clears the area. This is a widely-used protocol in a shooter situation, so expect to encounter the delay.

Tactical Medics that work with SWAT teams have a primary function of supporting the SWAT team. These specially trained Tactical Medics are trained to ignore civilian casualties as long as the SWAT teams are active and there is an ongoing threat situation. For example, in the 2016 Orlando, Florida Pulse nightclub shooting, it was several hours before medical assistance was provided inside the nightclub. In this type of situation, a First Care Provider trained in gunshot first aid can make the difference in saving a life. Time is everything.

First Aid Gear: Get It! Carry It!

Unfortunately, many range facilities and/or individual shooters do not have the proper gear to help when someone is shot, much less possess the first aid training to deploy it. For that reason alone, it is a good idea to educate and prepare yourself as a responsible shooter to make a difference when time is of the essence. Educate yourself on the First Care Provider skills and make them second nature. Carry your Individual First Aid Kit or “Blowout” kit with the essentials described in Chapter 4 wherever you go. Make it a piece of gear that is just as important as your gun, magazines, and ammo that you carry. The medical equipment should be part of your Every Day Carry (EDC) in your purse, briefcase, car, or pants. It is better to have it and not need it, than to need it and not have it.

S.M.A.R.C.H.R.™

S.M.A.R.C.H.R.™

S—SCENE SAFETY AND SECURITY: RECOGNIZE DIRECT AND INDIRECT THREATS

IMPORTANT POINTS

- **Active shooter? Crime? Accident?**
- **Is the scene safe? Is this a Direct Threat or an Indirect Threat situation? Ensure your own safety.**
- **Call 911 to activate EMS and put on personal protection equipment.**

Situational Analysis

Before you perform any first aid, you must ensure that the scene is safe and secure. You do this not only for the victim, but also for yourself. You do not want to become a victim as well. The most important thing to recognize in situational analysis and scene evaluation is the presence (or absence) of an ongoing immediate life-threatening event. There are only two possibilities: *Direct Threats* and *Indirect Threats.*

Direct Threat: There is an immediate ongoing threat to you and the victim. In other words, you are in the presence of gunfire (or other life-threatening event) that is continuing and ongoing. For example, you are at the food court in a mall and the shooting begins in the food court. As long as you are in the food court area, you are in a Direct Threat situation because your life is in immediate and imminent danger. In this situation, the principles are simple:

- Get off of the “X” or hot spot.
- Seek cover.
- Eliminate the threat.
- Direct the casualty to move to cover.
- Have the casualty begin self treatment with direct pressure or application of their own tourniquet.

When a traumatic situation is unfolding around you, first, pause—but not too long! Evaluate the situation before taking action. If there is an active shooter or some other ongoing violent criminal event taking place, your first course of action is to remove yourself from the threatening situation or seek cover and eliminate or decrease the threat against you! Do not be the next person shot.

As proponents of civilian carry, we believe the best medical treatment in an active gunfight is accurate rounds downrange at the threat, if necessary. You must eliminate the direct threat before performing first aid on anyone. If there is an ongoing threat and a victim is able to move, direct that person to move to cover if possible. If he or she cannot move, direct the victim to lie perfectly still. Perpetrators have a tendency to move on to the next target after shooting and witnessing someone fall. Remember bad guys often travel together, so watch for a second or even third threat.

Indirect Threat: In this situation, the area is dangerous, but there is not an immediate, ongoing threat to your life. If you are in the parking lot and hear gunshots inside the mall, while the area is dangerous and you need to leave, there is not an immediate Direct Threat to you. If you are behind cover and protected or safely hidden, there is not an immediate Direct Threat to you. In this situation, you are in the Indirect Threat phase. You should recognize that others may still be in a Direct Threat situation.

Unfortunately, these are highly fluid situations. For example, you could be in the parking lot of the mall when shooting starts in the food court. Initially, the people in the food court are in a Direct Threat situation, and you are in an Indirect Threat situation. However, if a second shooter appears in the parking lot, or if the food-court shooter escapes to the parking lot, then your situation changes to a Direct Threat.

Analysis of the immediate situation is critical to your survival and the survival of victims. In the Direct Threat situation, where bullets may still be flying and you are behind cover, it would be foolish to run to a victim in an attempt to help. This action on your part would only result in your becoming a casualty. It makes more sense to tell the victim to move off the "X," the danger spot where they were shot, self-treat by applying direct pressure or their own tourniquet, or to lie still. However, once the shooter has moved on, or the threat has subsided, this becomes an Indirect Threat situation, you are no longer in immediate danger, and can proceed to render aid without fear of becoming a casualty yourself.

When the situation allows a First Care Provider to begin (Indirect Threat phase), S.M.A.R.C.H.R.™ must be followed to give the patient the highest probability of survival.

Although S.M.A.R.C.H.R.™ will be discussed as separate steps, once the steps are learned, you, as the First Care Provider, will understand how multitasking allows for some of the steps to be combined for faster delivery of life-saving interventions.

How does this all come together in a gunshot (or other traumatic) situation? The principles remain, only the situation may change. S.M.A.R.C.H.R.™ is ONLY applied in the Indirect Threat phase.

Let's take a hypothetical situation and apply the principles of S.M.A.R.C.H.R.™ to it.

You are at the range on a Saturday morning shooting a new pistol. There are five shooters, including you, on the firing line. As you assemble your gear at the table located in your assigned shooting stall, you hear shots fired on the other lanes.

Suddenly, you notice the shooter to your right, two lanes down, falling backward from his place on the line. He is screaming in pain and holding his leg with his firearm still in his right hand. What just happened?

In our hypothetical gun-range shooting, pause and assess the situation. Here are some key questions to consider in this situation for safety and security:

1. Why did the shooter fall and grasp his leg?
2. It looks like he might be shot—who shot him?
3. Is it a self-inflicted gunshot wound from mishandling a firearm?
4. Is it a gunshot wound from a ricochet on the range?
5. Is it a gunshot wound from a firearm malfunction or negligent discharge?
6. Is it a criminal act? If so, WHERE IS THE SHOOTER?

7. Is the gun still in the victim's hand?
8. What are the other bystanders doing?
9. Is there any other information that you need to be aware of to react to the situation?

By quickly assessing the shooting situation, you are able to determine if this is the Direct Threat or Indirect Threat phase of care. Your analysis determines that the gunshot-wound victim is not the result of a crime or an active shooter. The man accidentally shot himself in the leg when he tried to re-holster his firearm.

How did you determine this? Initially, by assessing the surroundings and the people present, and then by talking directly to the victim. The victim says he shot himself; no one is acting violently or fleeing; only a single person is injured; there are no perceived criminal threats; etc. After you determine that there is not an ongoing criminal threat, you observe the victim is alert and oriented to his surroundings.

Next, identify the location of the weapon. Where is it and who has it?

In the range scenario, make sure the scene is safe and call a cease fire on the range. If present, let the range safety officer do it, and then go to work.

While evaluating safety, you need to simultaneously activate EMS. Call 911, or direct a bystander to do so, to activate the local EMS response. Put 911 on speaker mode so you can communicate and still render first aid.

Scene safety is critical. In our example, the victim still has his gun in his hand after he shot himself. Not good. Disarm the victim and make the gun safe so no one else gets shot. Be aware that the victim may still have his finger on the trigger. Our priority at this point is to reduce the chances of additional casualties. This is also a good time to notice the caliber of the weapon. This will, at minimum, give you an idea of the size of the entry hole and possibly exit wound you may be about to deal with. Once you have disarmed the victim and made the weapon safe, you can start assessing the necessary first aid treatment.

S.M.A.R.C.H.R.™
M—MASSIVE BLEEDING: WHEN IS IT AN ARTERIAL HEMORRHAGE?

IMPORTANT POINTS

- **Locate/treat all major arterial hemorrhages ASAP.**
- **Look for bright-red, squirting or pooling blood.**
- **Deploy a tourniquet on an arm or leg.**
- **Pack wounds with massive bleeding that are not suitable for tourniquet application, apply pressure, followed by application of a pressure dressing.**
- **Recheck.**

When is It an Arterial Hemorrhage?

Bright-red, squirting or pooling blood indicates the blood is highly oxygen enriched and is under pressure—an arterial bleed. Emergency! This type of wound will not clot on its own. If first aid is not rendered quickly, the person will die. Remember our shooting-range victim example earlier? He had bright-red, squirting blood—a massive arterial hemorrhage.

Three minutes or less. This is the time it will take for a person to die from a massive arterial hemorrhage. Therefore, massive arterial hemorrhage control is our number one first aid priority when dealing with a gunshot-wound victim. The rationale here is that an injury resulting in the destruction of a main artery can cause someone to bleed out. In comparison, airway and respiration issues are dealt with after massive arterial hemorrhages, because the average adult can go without oxygen for up to four minutes before suffering devastating effects, such as irreversible organ damage.

Therefore, in gunshot-wound first aid, always address major arterial hemorrhage control first and then move to airway and respiration issues. The time difference is not massive, but it may be the difference between life and death for the victim.

Massive life-threatening arterial bleeding may occur on an extremity, the neck, or on the torso (axilla [armpit], groin areas). As we will discuss, stopping the bleeding on an extremity requires a different technique than stopping the bleeding on the neck, axilla, or groin areas.

Large arterial hemorrhages are divided into wounds that *may* be controlled with a tourniquet and those that *cannot* be controlled with a tourniquet (compressible bleeding).

Most extremity arterial bleeding issues can be controlled with a tourniquet. There are some areas of the body which, when bleeding, cannot be controlled with standard tourniquets. The most common ones are the axilla (armpit), neck, and the groin. There are specialized tourniquets that have been developed to stop junctional (axilla and groin) arterial bleeding, but those require additional specialized training, different equipment, and cannot be carried in an IFAK due to their size. Using the equipment available to us in our IFAK, bleeding in these areas (axilla, groin, neck) must be packed using hemostatic gauze and a pressure dressing. Bleeding wounds of the chest and abdomen are treated with bandages (more on that later), but they are never packed because the chest cavity and abdominal cavity are so large that any attempts at packing are useless. In fact, packing the chest cavity will actually worsen the situation because the packing causes the lung to collapse with further respiratory function decrease.

How Do You Stop Arterial Hemorrhages?

The answer is training and tools. Short and simple, you must correctly deploy the right tools and training to turn the bleed off. By deploying first aid tools, such as tourniquets, gauze, and hemostatic agents, it is possible to stop major arterial bleeding and blood loss and delay shock in a victim, giving them time to reach definitive care. America’s experience on the battlefield proved that using these tools on a self-aid and buddy-aid basis greatly reduced mortality rates. Remember, first aid is about buying time for the victim to get to professional care. The location of the bullet wound on the victim’s body dictates the type of tool and technique to use, but all of them have the goal of stopping the bleeding.

How Do You Stop Bleeding? Depends on Wound Location.

We will now turn to the what and why of stopping major hemorrhages caused by a gunshot wound to:

1. The arms and legs.
2. The abdomen.
3. The neck.
4. The head.

We will deal with a gunshot to the chest in the R of our mnemonic S.M.A.R.C.H.R.™ Respirations. The tools and skills for each of these first aid procedures are covered in Chapters 4 and 5.

Arm or Leg: What Do You Do for a Massive Arterial Hemorrhage?

STEPS TO STOP BLEEDING

1. **Pressure on pressure points.**
2. **Apply tourniquet to stop the bleed.**
3. **Apply second tourniquet above the first, if necessary. Never remove a tourniquet.**
4. **Wound packing if not suitable for tourniquet application.**

If you or a victim have suffered a gunshot wound to an extremity, such as an arm or leg, that is causing massive arterial hemorrhaging, your immediate first aid is to apply direct pressure to the wound or associated pressure point to slow the bleed until you can get a tourniquet in place. Apply pressure with a knee. Push hard, because the pressure will likely only slow a massive arterial bleed, not stop it. However, slowing blood loss buys time to get the tourniquet in place.

Direct pressure at the femoral or brachial artery is best applied with a knee because tourniquet application is faster if two hands are used.

Be sure to position the tourniquet on the extremity above the wound (ideally, 2 to 3 inches) and tighten it to stop the bleeding. Always check the pulse point (radial on the arm and posterior tibial or dorsalis pedis on the foot) as we discussed in Chapter 2. Be sure that the tourniquet (Figure 2.2, Page 2-5) has successfully stopped blood flow, and the pulse is no longer palpable. Note: If you are not sure of the location of the bleed source, place the tourniquet as high as you can on the extremity: "High and tight."

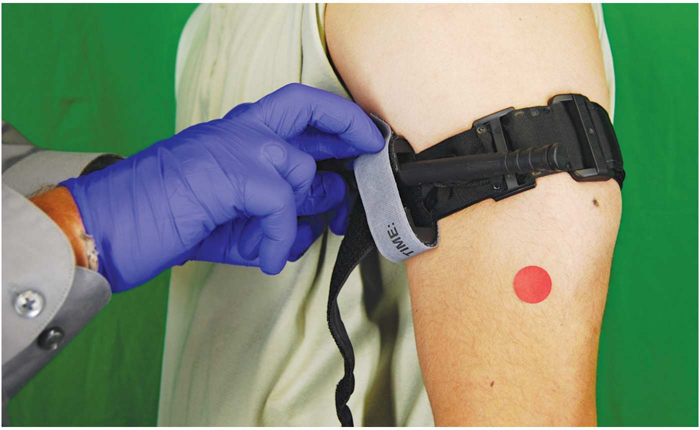


Figure 3.1: Massive bleeds on the arms and legs are stopped by using a tourniquet.

When using a tourniquet to stop a massive hemorrhage, you must tighten the tourniquet until the bleeding stops. Whether you use a professional or an improvised tourniquet, you must get the bleeding to stop. (See Chapter 4 for the minimum requirements of a tourniquet to be effective and the proper use of tourniquets.)

In the past, it was thought that a tourniquet was a last resort and tantamount to having to later amputate the limb. However, experience has taught civilian and military medical personnel that this is not the case. Save the life. Stop the bleed!

Never remove a tourniquet. If a tourniquet fails, apply a new one. Do not remove and reapply the one you have. Why? Because when you remove the existing tourniquet, it will allow the bleeding to continue and cause increased blood loss. It's better to apply a new tourniquet above the first one. (See Chapters 4 and 5.)

Let us return to our hypothetical victim at the range we talked about earlier. There is a wound on his upper thigh squirting bright-red blood, saturating his pants, and pooling on the floor. Emergency! He has a major arterial bleed.

Put on the appropriate personal protection equipment (such as gloves) before starting treatment (See Tools, Chapter 4.) While doing so, identify the source of the arterial bleeding—in our example, it is coming from the thigh. Immediately apply direct pressure to the femoral artery in the groin if the patient has profuse bleeding from a leg wound. This is done by kneeling on the femoral artery on the injured side while putting on gloves or getting your tourniquet ready. Specific identification of the entry and exit wounds is not critical at this point. The goal is to stop bleeding. Once the most profuse bleeding wound is located, treatment is initiated. For extremity wounds, a tourniquet is applied. After applying the tourniquet, check the distal pulse and be sure that it is no longer palpable. If it is still present, tighten the first tourniquet and/or apply a second tourniquet. Once the pulse is no longer palpable, this means that the tourniquet has been properly applied and the next step in care is initiated.

Neck, Armpit, Upper Leg, and Groin: What Do You Do for a Massive Arterial Hemorrhage?

STEPS TO STOP BLEEDING

1. **Use packing material.**
2. **Pack with pressure "to the bone" until bleeding stops.**
3. **Apply dressing on top of old pressure packing.**

If you must render first aid to a person who has a gunshot wound to the neck, axilla (armpit), or groin areas (Figure 3.2), tourniquets will not work because it is physically impossible to put a tourniquet on either the axilla or groin. Obviously, a tourniquet would **NEVER** be applied to the neck because this would strangle the person. But bleeding from these areas still must be stopped!

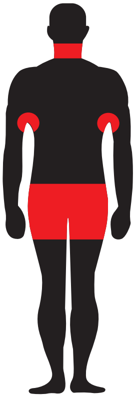


Figure 3.2: Neck, Armpit, Upper Leg, and Groin areas.

How Do I Stop the Bleeding?

If a tourniquet cannot be applied to the wound, then the only option to stop the bleeding is to pack the wound with gauze until the bleeding stops (Chapter 4).

What Do I Pack the Wound With?

Your first choice would be a hemostatic gauze, because blood clots form most rapidly with hemostatic gauze. However, if hemostatic gauze is not available, blood clots will also form with deep-wound packing using regular gauze, clean towels, shirts, and direct pressure, although this is much less effective. Remember, once a wound is packed, **NEVER** lift the packing to see if the bleeding has stopped. Doing so only destroys any clot.

When packing a wound, always apply more packing material on top of any blood-soaked packing material.

Once the wound has been packed to above the level of the skin and direct pressure has been applied until the bleeding stops, it is time to apply a trauma dressing. Trauma dressings keep the packing material in place and continue to apply pressure to the wound. Again, you must control the bleeding, or the victim will die. (See Chapters 4 and 5 for technique.)

How Do I Know if I Have a Massive Arterial Hemorrhage Under Control?

When performing wound packing, pressure must be continually applied until the wound-packing material is no longer becoming soaked with blood. For non-hemostatic packing materials (regular gauze, clothes, etc.), pressure must be applied until the bleeding stops. For hemostatic gauze, apply the direct pressure for at least 3 minutes. Do not remove packing materials to see if the bleeding has stopped. This action will destroy any clots that have formed. Add new packing material on top of old, always maintaining direct pressure on existing material.

When is It Not a Massive Arterial Hemorrhage?

By comparison, if the blood is not bright red and squirting or pulsating, but is instead dark red and oozing, this blood is not highly oxygenated and is under little pressure. While this situation may still cause a lot of bleeding, it will not be the profuse massive arterial bleed. It is most likely a bleed from a vein, called a venous bleed. While any type of bleeding is bad, this type of bleeding is generally not life-threatening and, therefore, is dealt with after Massive hemorrhages and Airway/Respiration issues. So, if you encounter only this dark oozing type of bleed in a victim, skip immediately to the next element in the S.M.A.R.C.H.R.™ Plan (A—Airway).

What Do I Do for a Gunshot Wound to the Head?

If you have a victim with a gunshot wound to the head that breaches the cranium, this situation is critical and, sadly, often results in a high mortality rate. The brain is a solid organ, and the tolerances between the brain and the skull are very tight. Therefore, any trauma to the head can result in the brain swelling and destructive pressure within these tight confines, creating a traumatic brain injury. Do not pack these wounds!

In a penetrating head wound, the projectile enters the cranium, but does not exit. A perforating head injury is where the projectile passes completely through the cranium. Experiences have shown around a 50% mortality rate attached to gunshot *perforating* head wounds versus around a 20% rate attached to gunshot *penetrating* head wounds. As the bullet passes through the skull and brain, tissue will be expanded, contracted, and destroyed along the path of the bullet. Temporary and permanent wound cavities develop in the brain as the kinetic energy is expelled. If the bullet does not exit the skull, it may ricochet around inside the brain, causing even more tissue damage.

Unfortunately, there is not much first aid you can do in the field for the devastating effects of a gunshot wound to the head. But even when confronted with this bad situation, there are some things you can do to help your victim until EMS arrives to transport them to a higher level of care. Remember these rules when dealing with a gunshot wound to the head:

1. Do not pack or apply hard, direct pressure to the wound site in penetrating or perforating head trauma. You could possibly push loose bone fragments into the brain. Scalp injuries bleed profusely. Cover the wound with a snug, but not tight, pressure dressing to help the clotting process and reduce bleeding.
2. Do not pack the nose or ears to reduce blood escaping through these cavities. This is the body trying to relieve intracranial pressure. To pack these areas would increase cranial pressure, which will be counterproductive and possibly fatal.

What Do I Do for a Gunshot Wound to the Abdomen?

Due to the size of the abdominal cavity, it is not possible to pack an abdominal wound. As is discussed in Chapter 4, superficial non-penetrating injuries of the abdomen are treated with a chest seal or a trauma dressing. Penetrating injuries of the abdomen without evisceration are also treated with chest seals or trauma dressings.

What Do I Do to Help Someone with an Evisceration?

As you will recall, an evisceration occurs with penetrating abdominal wounds that allow the abdominal contents to protrude from the body (Figure 3.3). When faced with an evisceration, there are two approaches to First Care Provider treatment.

1. The current TCCC recommendations for this type of injury are to gently push abdominal contents back into the abdomen (organ reduction). Be careful not to twist, pinch, or otherwise damage the protruding organs. While holding organs in the abdomen, quickly cover the wound (and organs) with a dressing, then wrap the abdomen with a trauma dressing.
2. The fact is that some people will not want to touch the organs to perform the reduction. Another option is to cover the protruding organs with a

moist, airtight dressing, such as plastic wrap. **DO NOT** apply a chest seal to the protruding organs because the adhesive on the chest seal will stick to the organs and make the problem worse. Cover the above dressing with a second soft dressing. Do not apply pressure to the dressings. Then loosely apply a trauma bandage to hold the dressings in place.

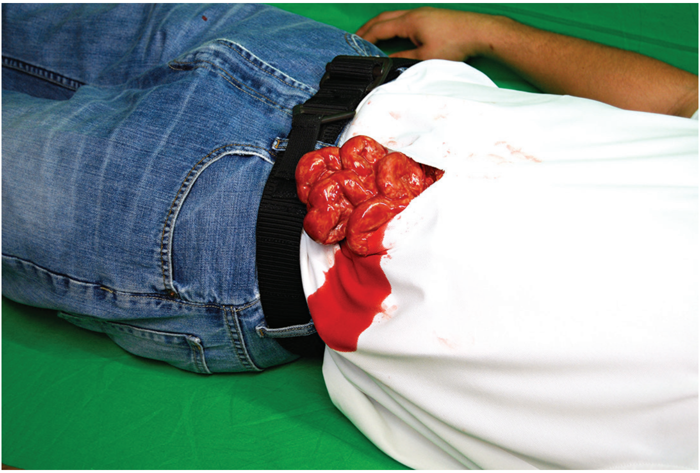


Figure 3.3: Evisceration.

If a moist, airtight dressing is used, be sure that all four sides of the abdominal dressing are secured with tape. Then apply a loose trauma bandage.

The objective is to keep the exposed organs moist, protected, and covered.

A moist dressing is used because we do not want these organs to be exposed to the air for any length of time. Exposed body organs dry quickly and are a potential source of loss of heat. Keep them moist and covered with a moist pressure dressing or field-expedient materials, such as plastic wrap, a garbage bag, or a piece of a poncho or rain coat.

Remember: Always treat massive hemorrhages and respiratory problems that are life-threatening before treating an evisceration.

S.M.A.R.C.H.R.™
A—AIRWAY:
IS THE AIRWAY CLEAR?

IMPORTANT POINTS

- **Look: Rise and fall of the chest.**
- **Listen: To breathing.**
- **Feel: For breath and check if the victim is unconscious.**
- **Finger sweep the mouth.**
- **Chin lift/Jaw thrust.**
- **Temporary Airway (NPA).**

After you have stopped the massive life-threatening arterial bleeding, it is time to make sure the victim has an unobstructed airway or a clear path to breathe. This is called a patent airway. This can be of critical importance in gunshot wounds to the neck.

Talk to the Victim

As you locate the wound, immediately start talking to the victim. This interaction will allow you to assess two things:

1. It gives you an idea if they have an unobstructed airway (patent airway).
2. It helps you make a quick analysis of their level of consciousness for evaluating hypovolemic shock.

Lack of oxygen initially causes a person to become anxious and combative. If the airway issue is not quickly resolved, the patient will become unconscious due to lack of oxygen. The lack of oxygen can be due to:

1. Lack of blood caused by excessive blood loss, as addressed under the M part of S.M.A.R.C.H.R.™
2. An airway blockage.
3. A respiratory issue (chest wound).

At this point, functioning of the airway must be confirmed. In other words, it must be open and not blocked. There are only two possible medical situations with the airway:

- It is either blocked or not blocked (open).
- The casualty is either conscious or unconscious.

By talking to the person, you can determine the airway situation in a few seconds. If the patient can talk to you, they are obviously conscious with an open airway. If they are unconscious, the First Care Provider must provide care to ensure that there is an open airway.

After determining the level of consciousness and whether the airway is open or blocked, first aid is initiated as follows:

1. In the unconscious casualty *without* airway obstruction:
   - Chin lift or jaw thrust maneuver.
   - Nasopharyngeal airway.
   - Place casualty in the Recovery Position.

2. In the casualty *with* airway obstruction (or impending airway obstruction):
   - Chin lift or jaw thrust maneuver.
   - Nasopharyngeal airway.
   - Allow a conscious casualty to assume any position that best protects the airway, including sitting up.
   - Place an unconscious casualty in the Recovery Position.

Does the Victim Have a Clear Path to Breathe?

The airway is assessed by “look, listen, and feel.” If possible, engage the victim in conversation. This will give you an opportunity to assess whether the airway is open and assess their level of consciousness at the same time. Ask closed-ended questions. Examples: “What is your name? Where are you? How old are you?” etc. If your victim is a stranger, obtain his driver’s license and ask direct questions, such as birthday, address, or age.

If they are talking, they are breathing. Reassess often to determine any changes in condition.

Remember, the airway is not only the lungs, but also all of the component parts of the path to get air to the lungs. The airway consists of the upper airway—the mouth, nose, and the back of the throat (pharynx); and the lower airway—the trachea (windpipe), two branches of the trachea called bronchi, and the lungs themselves.

Look, Listen, and Feel

If a victim is unable to talk, how do you assess their airway? You **LOOK** for the rise and fall of the chest, **LISTEN** for the passing of breath through the nose and mouth, and **FEEL** for the presence of the victim's breath on the side of your cheek, if necessary. You are seeking evidence that the victim is moving air. Indications of a compromised airway may include difficult or noisy breathing (snoring, wheezing), or a bluish or grayish color to the lips (cyanosis). If the victim is not moving air with breathing, they may have a blocked airway. Investigate and try to unblock the airway.

How Do You Clear a Victim's Airway?

Check the victim's mouth. Remember that the most common cause of airway obstruction in an unconscious victim is the tongue! Reposition the victim's head to open the airway. Then, perform a finger sweep of the mouth to remove debris and ensure the tongue is not obstructing the airway.

If this doesn't work, then resort to the chin lift and jaw thrust skill described in Chapter 4. These steps work in most people without catastrophic airway injuries. However, if you have a victim for whom these procedures have not achieved a "patent" or unobstructed airway, it is time to create a temporary open airway using the nasopharyngeal airway (NPA).

Clearing an Airway: How Do You Create a Temporary Airway?

One of the best ways to create a temporary open airway is to use the tool in your kit called a nasopharyngeal airway (NPA), affectionately known as a “nose trumpet” (Chapter 4).

An NPA is nothing more than a very flexible rubber-like hose that is inserted in the victim’s nose (either nostril), and guided to the back of the pharynx. The hose acts as a temporary airway to keep a space open, bypassing the mouth to the trachea, to allow air to flow to the lungs during breathing. While the concept of inserting a rubber hose up a person’s nose is foreign to the unindoctrinated, it is a simple-to-use and effective non-invasive first aid tool that can keep a victim’s airway open so air can get to their lungs. Use of the NPA will be discussed in Chapter 4.

NPAs should be used on unconscious victims, but also may be used on semi-conscious victims or even fully awake victims. The NPA will keep the tongue from falling back and obstructing the airway. The NPA is useful when a victim’s upper airway becomes inflamed or swollen due to trauma, burns, allergic reaction, etc. Likewise, an NPA is especially useful in victims who are having seizures and have been placed in the Recovery Position.

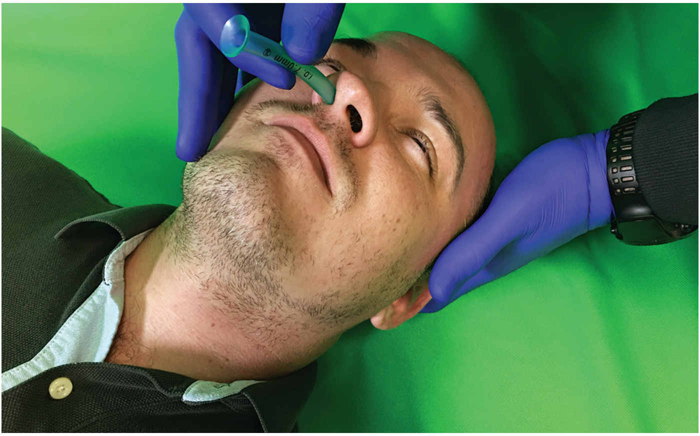


Figure 3.4: NPA insertion.

When Not to Use an NPA

If the victim has a facial or skull fracture, **DO NOT** use the NPA. You could bypass the nasal cavity and accidentally insert the hose in your victim's brain.

How Do I Spot a Facial or Skull Fracture?

Indicators of a skull fracture include cerebral spinal fluid (CSF) leaking from the nose or ear canals. CSF is a clear, water-like fluid. If it is leaking from the ear canals, or if blood is leaking from the ear canals, this is a significant sign that the patient has some type of skull fracture.

If the Victim is Unconscious

A natural thing to do for an unconscious victim is to place them on their back. However, this is not a good idea, because it can allow the airway to be obstructed by a flaccid tongue, blood, debris, or vomit. Therefore, place an unconscious victim in the recovery position as described later in this chapter.

If the victim is conscious, allow them to get in a position of comfort that best assists the airway. Sometimes they are more comfortable sitting up and leaning forward. The conscious victim with airway difficulty needs to be treated, but once treated, let them decide on the proper position to maintain an open airway.

Other Airways: Beyond this Book

An NPA will not achieve a secure airway that is isolated from obstructions like vomit and blood or lower airway obstruction. It will only achieve an open upper airway. A good example of a secure airway would be one that creates a total isolation of the airway or a surgical airway (cricothyrotomy) that bypasses the entire upper airway. These techniques are complex, invasive, and beyond the scope of this first aid book and even most emergency medical personnel. Using an NPA, by contrast, is a basic tool all gun owners need to understand and master.

Notes on Level of Consciousness

Level of consciousness is an indication of mental alertness and how the brain is functioning. As the blood flow decreases due to blood loss and the oxygen delivery to the brain decreases, mental functioning will begin to deteriorate. This decreased brain function (cognitive thinking/functioning) is severely affected by:

- Decreased blood flow (hypovolemic shock);
- Decreased oxygen delivery;
  — Hypovolemic shock
  — Respiratory distress
- Traumatic brain injury (concussion).

However, if you are talking to a patient who appears to be conscious but is not responding, this may be due to the patient being very close to a concussive explosion or a loud gunshot and is experiencing a temporary loss of hearing.

Levels of consciousness are categorized as:

A = Alert: Victim is alert and oriented to his or her surroundings.

V = Verbal: Victim is only alert to verbal stimulus.

P = Pain: Victim is only alert to pain stimulus, such as a sternum rub or pinch on a sensitive area.

U = Unconscious: The victim is unconscious and/or unresponsive. The level of consciousness will dictate first aid procedures later. Level of consciousness, taken in conjunction with other clinical indicators, (palpable radial pulse) are indicators of the presence or absence of shock.

When a patent airway is achieved, it is time to move on to Respiration.

S.M.A.R.C.H.R.™
R—RESPIRATIONS: BREATHE BABY, BREATHE

IMPORTANT POINTS

- **Locate holes in chest—seal the holes.**
- **Do not pack wounds to the chest.**
- **Watch for signs of tension pneumothorax—increased difficulty breathing, anxiety, shortness of breath, gasping, decreasing level of consciousness.**
- **If a tension pneumothorax develops, burp the dressing.**

After you have controlled massive arterial hemorrhages and ensured the airway is unobstructed, it is time to turn to the victim's respiration. The act of respiration is simply breathing; inhaling and exhaling. The components of the respiratory system work together to expand the rib cage, creating a negative pressure, causing air to enter the lungs. The components then relax, causing the chest to contract, forcing air out. This happens with each breath. An injury to any part of the respiratory system can disrupt the equilibrium of the entire respiratory system and cause carbon dioxide to be retained. When this happens, a victim's breathing rate and depth of the respirations increase in an attempt by the victim's body to get rid of the carbon dioxide and re-oxygenate the blood.

If a person gets shot in the chest and the bullet penetrates the chest, there is a hole in the respiratory system. Even if a victim is not suffering from a massive arterial hemorrhage, a breach in the respiratory system can still quickly lead to a life-threatening complication. Quick and effective first aid to "re-seal" the respiratory system can buy time for the victim until definitive care arrives.

What Do I Do for a Gunshot Wound to the Chest? Seal the Chest.

A victim with a gunshot wound to the chest will be gasping for air and having difficulty breathing. This person may die if you don't take quick action. In this situation, the chest cavity is no longer sealed. Treatment for a chest wound starts with immediately sealing any open wounds with an occlusive dressing (one that will block airflow) or chest seal to stop the flow of air through the wound.

What is a Chest Seal?

A chest seal is a professionally manufactured or improvised bandage that is airtight and watertight to cover and seal a bullet wound to the chest, which stops air from being sucked or pushed through the hole. It functions like a patch for a tire or inner tube (Chapter 4).

What Do I Use for a Chest Seal?

Ideally, use a professionally manufactured vented chest seal. They will be easier to deploy and save valuable time for your victim. However, if you don't have one—improvise! As we will discuss in Chapter 4, almost any airtight, watertight, flat surface big enough to cover the bullet hole (at least 2 inches on all four sides) may be used instead of a professional chest seal. It must be capable of being secured with pressure or tape, and not allow air to be sucked or leaked in or out of the bullet hole. Use a piece of a plastic bag, or as we will demonstrate, the cover of this book. Seal the wound!

There are two types of commercial chest seals: Non-vented and vented. The non-vented chest seals were developed first. These are simply pieces of plastic with adhesive on one side so that the seal sticks to the skin. Unfortunately, non-vented chest seals may cause the development of a problem known as a tension pneumothorax (as discussed in Chapter 2). Untreated, this is a potentially fatal condition that develops after chest wounds are sealed.

The newer chest seals are vented. These seals were developed with air channels that specifically allow chest wounds to be sealed without the risk of a tension pneumothorax developing. Whenever a chest seal is used, the First Care Provider needs to know if it is non-vented (the victim may develop a tension pneumothorax that then needs to be treated) or vented (which is much safer).

Seal, Never Pack a Gunshot Wound to the Chest

Because the lungs are a hollow organ and the chest is a huge cavity, chest wounds are sealed and never packed. Why? It would take a tremendous amount of material to pack a chest wound, and this is completely impractical. More important, packing the chest wound tightly can cause the remaining lung to collapse and stop functioning. In packing a chest wound, you are actually making the situation worse. So, seal—don't pack—a bullet wound to the chest!

What is Defined as the Chest?

For gunshot first aid purposes, any bullet hole that occurs from the nape of the neck to just above the navel, front flanks (sides), or the back gets a chest seal. Both entry and exit wounds must be sealed.

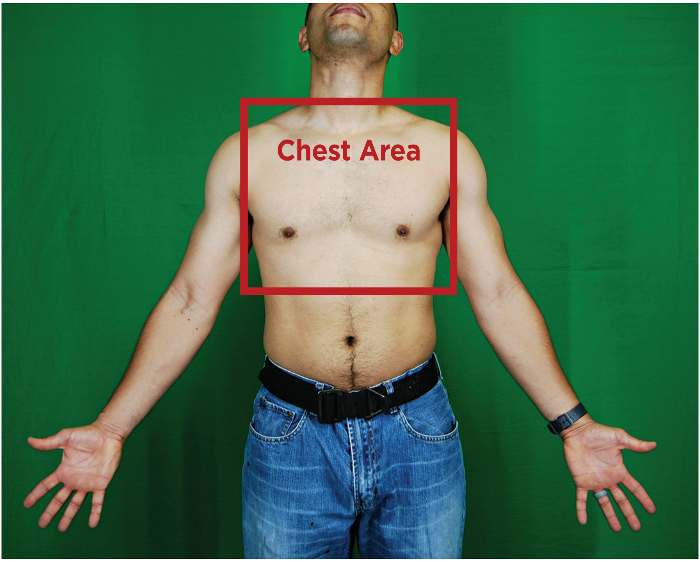


Figure 3.5: Chest area: front.

Why Do We Seal Any Bullet Wound To Any Area of the Chest?

A penetration of the chest cavity by a bullet can cause a pneumothorax and/or a sucking chest wound regardless

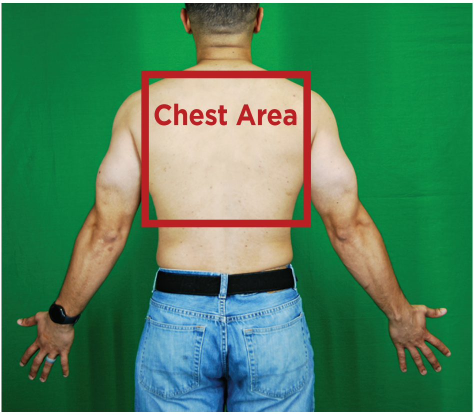


Figure 3.6: Chest area: back.

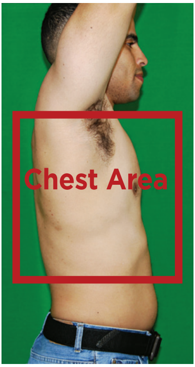


Figure 3.7: Chest area: side.

of where the entry point is on the chest. It is not unusual to have bullet and shrapnel wounds that have entry points high on the top of the shoulder that become sucking chest wounds. The bullet can travel through the tissue in the shoulder and perforate a lung. As a result, the gurgling, sucking chest wound can be on top of the shoulder. It is better to be safe than sorry, so seal all chest wounds, both entry and exit.

When Will a Sucking Chest Wound Develop?

A bullet wound to the chest will likely develop into a sucking chest wound if the bullet has made a hole in the chest wall that is two-thirds the diameter of the trachea (an adult trachea is 1-inch wide).

Watch for Signs of a Tension Pneumothorax

If your victim has a gunshot wound to the chest and you have successfully sealed the bullet holes, it is time to watch for the life-threatening condition we talked about earlier called a tension pneumothorax (Chapter 2). This unwanted pressurized air pocket between the lungs and the pleural space is the second major cause of death for bullet wounds that were initially survivable, thus, quick first aid is imperative. The symptoms of this condition may take time to appear or may manifest themselves immediately.

What Are the Symptoms of a Tension Pneumothorax?

If the victim was just shot in the chest, naturally they will have a lot of discomfort. However, you should look for signs that they are having more than just discomfort. You are looking for signs that they are having major difficulty breathing. This will include a very distinct difference in the rise and fall of the chest on the affected side. In addition, the victim will be gasping, sometimes violently, for air in a vain attempt to get their breath. The victim may be highly agitated and anxious. Also, a condition called cyanosis, the bluing of the victim's lips and fingernail nailbeds, will develop. Distended neck veins and deviation of the trachea (windpipe) are late-developing signs and if noticed, require immediate action! You must let the pressurized pocket of air out of the pleural space, or the victim may die.

How Do I Help a Victim Who Develops a Tension Pneumothorax?

When a tension pneumothorax develops, the pressurized air pocket in the pleural space or chest cavity causes the lung to collapse and the heart to shift positions in the chest. This is a critical, life-threatening emergency. The victim may soon die if the pressure from the air pocket is not reduced. Treat a tension pneumothorax by "burping" the chest seal. Untape and lift one side of the seal, allowing the buildup of pressurized air in the lung cavity to escape, thus relieving the abnormal pressure on the injured lung that is causing it to collapse (Chapters 4 and 5).

Another way of treating a tension pneumothorax is by placing a needle into the chest on the injured side. This is called a needle decompression. However, when done incorrectly, the needle decompression may cause significant and potentially fatal bleeding. It is beyond the scope of this guide, and should only be done by experienced medical personnel.

The whole issue of tension pneumothorax is minimized by using a vented chest seal as discussed above.

It is now time to move on to Circulation issues in the S.M.A.R.C.H.R.™ plan.

S.M.A.R.C.H.R.™
C—CIRCULATION:
STOP ADDITIONAL BLEEDING

IMPORTANT POINTS

- **Checking the pulse allows you to better recognize the presence of shock.**
- **Absent pulse equals no circulation to body cells.**
- **Shock—absent or weak radial pulse AND an altered mental status (confusion) in the absence of a head injury.**
- **Find and stop other bleeding.**

Shock is the Enemy!

If you have the victim's massive hemorrhages under control and you have dealt with airway and respiratory issues, it is time to think about circulation and shock caused by the blood loss. In this portion of the S.M.A.R.C.H.R.™ plan, C is for the Circulation evaluation step and is performed by assessing the victim's circulation through blood pressure at the pulse sites discussed in Chapter 2. You are trying to determine if the victim is in shock or in danger of slipping into shock.

How Much Blood Loss Will Cause Shock?

The average person's body contains 5 to 6 liters of blood, around 1.5 gallons. A 15 to 30% loss of total blood volume can create a life-threatening condition we discussed earlier called hemorrhagic or hypovolemic shock (simultaneously causing hypothermia caused by blood loss). So, a loss of a little more than a quart of blood can cause life-threatening shock.

Evaluating Circulation

As we discussed in Chapter 2, the body has several pulse sites that allow for the assessment of the blood pressure in a victim. If a pulse is detectable at one of these sites, the victim at least has the blood pressure that corresponds to that site (Figure 2.3). Low blood pressure (lack of a perceivable pulse) for purposes of this evaluation is often an indicator of large amounts of blood loss and the onset of hypovolemic shock.

In the absence of diagnostic tools (blood pressure cuff), shock is determined in the field by:

- A weak or absent radial pulse; and
- An altered mental state (confusion) in the absence of a head injury.

When checking for a radial pulse to determine shock, remember that the pulse check MUST be done on the arm that does not have a tourniquet. If a pulse is felt there, it will also be felt at the femoral and carotid pulse points (see Figure 2.3 for mmHg and pulse counts). If a tourniquet has been placed, that extremity should not have a palpable pulse.

What Can be Done in the Field to Assist a Victim of Shock from Blood Loss?

Without trained personnel and equipment, the first aid available for someone suffering hypovolemic shock due to blood loss is very limited. During this part of TCCC and TECC, trained medical providers will give intravenous (IV) or intraosseous (IO) fluids, such as saline, or blood transfusions. While these techniques are beyond the scope and skill set of the First Care Provider, there are things he or she can do to help the circulatory status.

At this point, the life-threatening bleeding has been stopped under the Massive arterial bleeding phase, but there may be other bleeding wounds that do not involve massive arterial bleeding, but are bleeding nonetheless. Now that the Airway has been secured and any chest wounds have been sealed (Respirations), it is time to stop the non-life-threatening bleeding, preserving as much blood as possible for the Circulation. How is this accomplished? A head-to-toe exam is performed. Start with performing a “Blood Sweep.”

Blood Sweeps: Looking for Other Bleeds

Begin at the head and examine the victim from head to toes for any other sources of bleeding and other wounds. Not all bleeding wounds are visible at first glance. Even if the major bleeds are evident and easily identifiable, you still follow-up with a “blood sweep,” a term for checking the victim for any other less obvious bleeds. This ensures that you increase your chances of identifying additional injuries that need to be treated and bandaged.

It is now time to move on to Hypothermia.

S.M.A.R.C.H.R.™
H—HYPOTHERMIA: KEEP THE VICTIM WARM

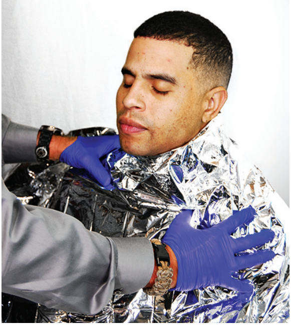
IMPORTANT POINTS

- **Hypothermia caused by blood loss can happen in even hot conditions. To prevent this, you must stop the hemorrhages as quickly as possible.**
- **Keep the victim warm. Hypothermia increases the mortality rate of any trauma victim.**
- **Do not give warm liquids—it won't help, and could kill!**
- **Treat other bleeding wounds.**

As previously discussed, hypothermia is a potentially fatal condition in the wounded person. After all of the wounds have been addressed, it is time to keep the victim warm. When wrapping a victim to prevent hypothermia, be sure to provide some type of insulation between the person and the ground. They can be covered with any type of clothing or material. Be sure to wrap their head to prevent heat loss. (Ask any bald-headed man why he wears a hat in the winter!) This is where Mylar survival blankets are a great help (Figure 3.7). They occupy very little space in your IFAK and are very effective for preserving body warmth. The object is to preserve body heat.

With the major treatment areas taken care of, it's time to look at the Recovery Position.

Figure 3.7: Mylar survival blanket.



S.M.A.R.C.H.R.™
R—RECOVERY POSITION: MINIMIZING RISK OF FURTHER INJURY

IMPORTANT POINTS

- **Recovery Position.**
- **If victim is unconscious, monitor drainage to prevent aspiration.**

Cause No Further Injury

After you have completed all the other first aid, it is time to place your victim in what is known as the Recovery Position and monitor him or her until EMS arrives. The Recovery Position is a physical position where the patient is placed on his or her side on the ground (Figure 3.8). This position will minimize the risk of airway blockage from blood, aspiration of vomit, or a flaccid tongue.

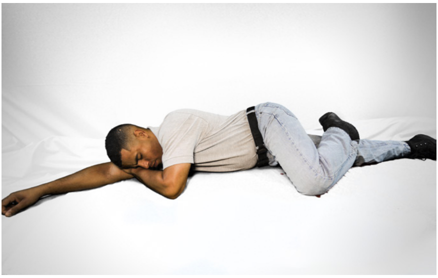


Figure 3.8: Recovery Position.

At this point, all major life-threatening issues have been addressed — Massive hemorrhage, Airway, Respirations, Circulation, and Hypothermia. It is now time to pause, slow down, and Reassess the patient. The accompanying checklist can serve as a reminder. The First Care Provider starts by checking that any tourniquets and pressure dressings are still effective, the airway is still open, the chest seals are working, the patient is breathing, and a tension pneumothorax has not developed.

This completes the S.M.A.R.C.H.R.™ program.

REASSESSMENT CHECKLIST

- ✓ **Check Massive Bleeds**
  - ☐ Tourniquets
  - ☐ Wound packing
- ✓ **Check Airways**
  - ☐ Airway
- ✓ **Check Respirations**
  - ☐ Chest seals
  - ☐ Tension pneumothorax developing?
- ✓ **Check Circulation**
  - ☐ Blood Sweep
  - ☐ Treat additional wounds
- ✓ **Check Hypothermia**
  - ☐ Keep victim warm
- ✓ **Check Recovery Position**

Reassess S.M.A.R.C.H.R.™

Figure 3.9: Reassessment checklist.

CHAPTER 4

BLOWOUT KIT: FIRST AID TOOLBOX AND TECHNIQUES FOR GUNSHOT WOUNDS

What Should You Have in Your First Aid Toolbox?

If you carry a gun, keep a first aid toolbox in your house or car. If you go shooting, hunting, or any other time you are around guns, have a first aid toolbox. You may need it. In the military, we would refer to the Individual First Aid Kit (IFAK) as a "blowout" kit. So, what should be in your civilian blowout kit? At minimum, we recommend that you have the following:

BLOWOUT KIT RECOMMENDATIONS

- 2 tactical tourniquets
- 2 vented chest seals
- 1 hemostatic gauze
- 1 trauma dressing
- 1 nasopharyngeal airway (NPA) with lubricating gel
- 2 pairs of gloves
- 1 compressed gauze
- 1 trauma shears
- 1 permanent marker
- 1 survival blanket

Optional:

- 1 flashlight
- 1-inch adhesive tape
- 1 resealable plastic bag

S.M.A.R.C.H.R.™

S—SCENE SAFETY AND SECURITY: RECOGNIZE DIRECT AND INDIRECT THREATS

Scene safety and security is an essential tool that you need to be completely familiar with and know how to use. However, this "tool" deals with evaluation of a potentially life-threatening situation and is not actually a tool in the IFAK, as we discussed in Chapter 3.

S.M.A.R.C.H.R.™
M—MASSIVE ARTERIAL BLEEDING
TOOLS TO STOP THE BLEED: TOURNIQUETS

During the M phase of care, the only goal is to stop massive life-threatening arterial bleeding. This does not mean that all bleeding wounds are treated in this phase of care. Non-life-threatening bleeding should be ignored until later in S.M.A.R.C.H.R.™ The most common areas of life-threatening arterial bleeding are:

- Leg or arm wounds that are treated with tourniquet application;
- Groin or armpit wounds that are treated with wound packing;
- Leg or arm wounds may also be treated with wound packing if tourniquets are not available or have failed;
- Neck wounds with profuse bleeding are treated with packing and trauma dressings.

At this point in S.M.A.R.C.H.R.™, non-life-threatening bleeding is ignored.

What is a Tourniquet?

Tourniquets are your best tool to control massive arterial hemorrhaging on an extremity (arm or leg). The tourniquet is a device designed to clamp down on a major artery in an extremity by exerting mechanically-applied pressure to surrounding tissue with a constricting force created by a band secured around the victim's arm or leg. When properly used, the pressure exerted by the tourniquet effectively compresses the artery, so as not to allow blood to flow past where the tourniquet is placed.

Tourniquets may be a state-of-the-art tactical tourniquet or a homemade field-improvised tourniquet. Both seek to stop the bleeding through constriction.

However, there is a significant difference between a commercially manufactured tourniquet and an improvised tourniquet when it comes to successfully stopping the bleeding. Quality manufactured tourniquets, when properly applied, have a 95% success rate in stopping bleeding. Improvised tourniquets, such as a belt or shirt tied around the extremity, have close to 100% failure rate. Improvised tourniquets, such as a shirt with a windlass, typically have a 70% failure rate. So a well-designed tourniquet is worth the cost.

How Do I Choose a Tourniquet?

The best first aid choice to stop major extremity arterial bleeding is a commercially manufactured tactical tourniquet. There are many commercial tactical tourniquets on the market that work very well. One great thing about the new generation of tourniquets is that they may be applied with one hand, in case you have to self-apply it to your own arm or leg. Most have a built-in locking device for the windlass to secure the tourniquet once you have applied it and stopped the blood flow. Modern tactical tourniquets have a proven track record and work. Be sure that you have the right tool for the right job.

NOTE: BUY GOOD GEAR. BE AWARE THAT THERE ARE CHEAP TACTICAL TOURNIQUETS OFFERED ON THE MARKET. STAY AWAY FROM THESE PRODUCTS. THEY ARE NOT CONSTRUCTED TO WITHSTAND THE FORCES APPLIED TO THEM IN EXTREME CONDITIONS AND MAY FAIL, PUTTING YOURSELF OR THE VICTIM IN JEOPARDY. SOME OF THE COUNTERFEIT TOURNIQUETS ON THE MARKET ARE VERY DIFFICULT TO TELL FROM THE REAL THING, UNTIL YOU TRY TO USE THEM AND THEY FAIL. SPEND THE EXTRA MONEY TO GET THE REAL TOURNIQUET, NOT THE COUNTERFEIT.

The Committee on Tactical Combat Casualty Care (CoTCCC) makes recommendations on tourniquets that are acceptable to the military. These recommendations are based on research done by the Institute of Surgical Research (ISR). The ISR is a research branch of the U.S. Army that conducts research in several areas, but has a specific interest in, among other areas, evaluating methods of treating trauma and evaluating medical devices that have been developed to treat trauma victims. The CoTCCC recommends treatment methods and devices based on current research literature, current best practices of medical care, and ISR research.

While there are a number of tourniquets on the market, the only two tourniquets currently recommended by CoTCCC are the Combat Applications Tourniquet (CAT) and the SOFT-T tourniquet.

After deciding on a tourniquet for your own use, be sure to understand how to use the tourniquet correctly. While the concept behind each tourniquet is the same, the technique is specific to each tourniquet. The technique for application of the CAT is different than the technique required for the application of a SOFT-T tourniquet.

Where Do I Apply a Tourniquet?

A tourniquet must be applied above the bleeding wound that is causing the massive hemorrhage. Application recommendations are that the tourniquet be applied approximately 2 to 3 inches above the wound. This means that the tourniquet would be applied to the injured arm or leg approximately one hand width above the wound, between the wound and the groin area (for the leg) or between the wound and the armpit area (for the arm).

As a general rule of thumb:

- For leg injuries below the knee, the tourniquet should be placed at the mid-thigh.
- For upper-leg injuries, the tourniquet should be placed 2 to 3 inches above the wound (closer to the groin). If there is not this much space available, it should be placed as high as possible.
- For forearm injuries, the tourniquet should be placed at the mid upper arm.
- For upper-arm injuries, the tourniquet should be placed 2 to 3 inches above the wound (toward the armpit). If there is not this much space available, it should be placed as high as possible.

How Do I Apply a Tourniquet?

The technique for application of the commercial tactical tourniquet is specific to the tactical tourniquet. A CAT tourniquet is applied differently than the SOFT-T, for example. Be sure to read and follow the manufacturer's directions. General directions are:

1. Identify the wound and apply tourniquet 2 to 3 inches above the wound (toward the body). If the wound cannot be identified, apply the tourniquet as close to the body as possible on the injured extremity (Figures 4.1 and 4.2).
2. Remove all of the slack from the tourniquet.

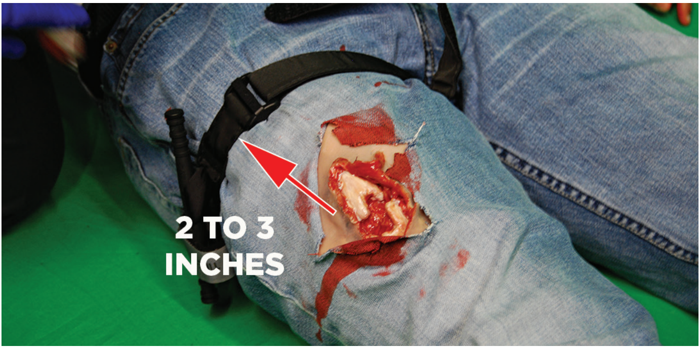


Figure 4.1: Apply a tourniquet 2 to 3 inches above the wound, or as high as practical.

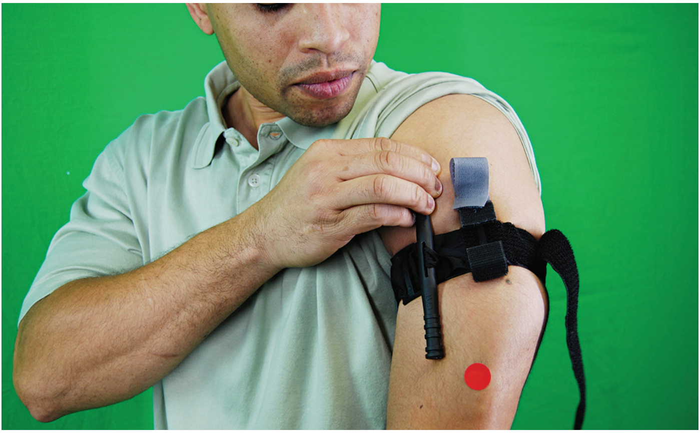


Figure 4.2: Tourniquet self-help.

3. Turn the windlass as tightly as possible. In general, if you have to turn the windlass more than three turns, the tourniquet slack was not adequately removed and the tourniquet will not work properly.
4. Lock the windlass.
5. Check for the absence of a pulse below the tourniquet.
6. Mark the time of tourniquet application.

How Tight Do I Make the Tourniquet?

When a tourniquet is properly applied to the arm, the radial pulse at the wrist will no longer be felt. The pulses at the ankle (posterior tibial pulse) and foot (dorsalis pedis pulse) will be absent when a leg tourniquet is working properly.

What if a Tourniquet has Been Applied and the Patient Still has a Pulse?

There are several reasons the bleeding may continue after a tourniquet has been applied:

- The tourniquet is not properly applied. For example, it was placed over a joint or over a pocket containing a cell phone or other articles.
- The tourniquet may be loose, and the windlass needs to be tightened.
- The tourniquet may have broken, which is common when using counterfeit tourniquets.
- The extremity may be large due to fat and muscle, and a second tourniquet may be necessary.

In this situation, the first thing to do is check the position of the tourniquet.

- Is it over a joint?
- Is it over a pocket containing objects?
- Is it applied below the wound rather than above the wound and closer to the body in the correct position?
- Is it too close to the wound or on top of the wound?
- Was the slack taken out of the tourniquet before turning the windlass?

- Was the windlass completely tightened?
- Is the leg large?

Assuming the tourniquet placement and application are correct **AND** a pulse is still present, the most likely cause of continued bleeding is the size of the leg or arm. In this case, if a second tourniquet is available, it should be applied right next to the first one. You want the tourniquets either touching or almost touching. If there is a gap between the two tourniquets, the bleeding will most likely continue.

However, if a tourniquet has been successfully placed **AND** the pulse is absent, there may still be some bleeding from the wound. The massive pulsatile arterial bleeding should have stopped due to the successful placement of the tourniquet, but the remaining bleeding is from the blood that is trapped in the injured extremity by the tourniquet and which may leak out of the wound.

Once the arterial bleeding has been stopped, the remaining oozing from the wound can be ignored until the Circulation step in **S.M.A.R.C.H.R.**™

Document the Tourniquet Application Time

After you have applied a tourniquet to a victim, never allow the tourniquet to be covered by clothing. Mark the victim on the hand, forehead, or both with a large "T" accompanied with the time of the tourniquet application. Some tourniquets have space on the tourniquet to mark the time of application (Figure 4.3). This must be done so that medical care providers know how long the tourniquet has been on the patient when more definitive medical care is initiated.

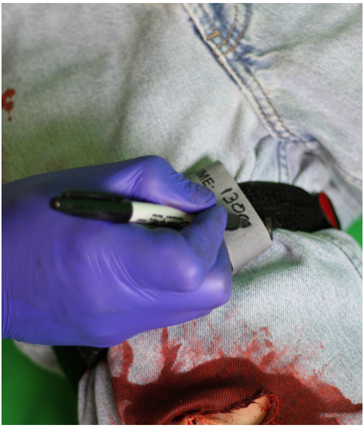


Figure 4.3: Visibly document that the victim has a tourniquet applied and when it was applied.

How Long Can a Tourniquet Stay On?

If a tourniquet is left on for two hours or less, the chances for any damage to that extremity are minimal. During major surgical procedures to upper and lower extremities, surgical tourniquets are sometimes left in place for hours.

In Iraq and Afghanistan, warfighters with delayed medical evaluations due to hostile fire or difficulty of the surrounding terrain often had their tourniquets left in place for several hours before reaching a surgical unit. The rationale here is that a very small risk of injury later is much better than the large risk of dying from a major hemorrhage that cannot be controlled.

Tourniquets are very painful and uncomfortable for the victim. No matter how much the tourniquet hurts, never loosen or allow the victim to loosen the tourniquet. Doing so can yield deadly results from the major bleed, which was successfully stopped and then restarts.

When Do I Remove a Tourniquet?

Do not remove a tourniquet from a victim once it is applied. Removing a tourniquet should only be done by a trained professional who is able to give definitive care after removal.

Can I Practice with the Tourniquet in My Toolkit?

The CAT and SOFT-T tourniquets are designed as single-use devices and should **NEVER** be used for practice.

There are training tourniquets available. One should be purchased. Correct application of a tourniquet is a perishable skill, just like shooting. Tourniquet application must be practiced with the goal of correct placement in 30 seconds or less.

How Do I Make an Improvised Tourniquet?

If, for whatever reason, your toolkit is empty of tactical tourniquets and you find yourself dealing with a massive arterial bleed, it is time to make a tourniquet out of common objects or proceed with wound packing.

The core components of a tourniquet are:

1. The band, strap, or material that goes around the arm or leg, constricts the extremity and pinches off the underlying blood vessels when the windlass rod is tightened.
2. The mechanical device, called a windlass rod, that converts turning or twisting force into constriction force on the band that compresses tissue and underlying blood vessels on the arm or leg.

Each component has minimum requirements for the tourniquet to be effective. Tourniquets are simple to construct; however, up to 70% of homemade or improvised windlass tourniquets fail because they don't meet minimum requirements to do the job. Again, improvised tourniquets that do not have a windlass (such as a belt or shirt tied tightly around an extremity) have close to a 100% failure rate.

When an improvised tourniquet fails (wrist or ankle pulse remains palpable), it makes the situation worse by **INCREASING** the rate of blood loss. This occurs because the homemade tourniquet generates enough pressure to compress the veins, but not the arteries. As a result, compression of the veins prevents blood from returning to the heart. But because the arteries are not compressed, the heart continues to pump blood into the injured extremity and out of the wound. As a result, the rate of blood loss actually increases due to the poor tourniquet application (Figure 4.4). When this occurs, it is called a venous tourniquet because only the veins are compressed. However, this same situation may occur with incorrectly tightened commercial tourniquets. The only way to determine if the tourniquet application has been effective is to check the distal pulse. If the tourniquet has been applied and the injured extremity still has a pulse, then a venous tourniquet has been applied and the situation needs to be corrected immediately!

INCORRECT APPLICATION MAY RESULT IN A DANGEROUS VENOUS TOURNIQUET

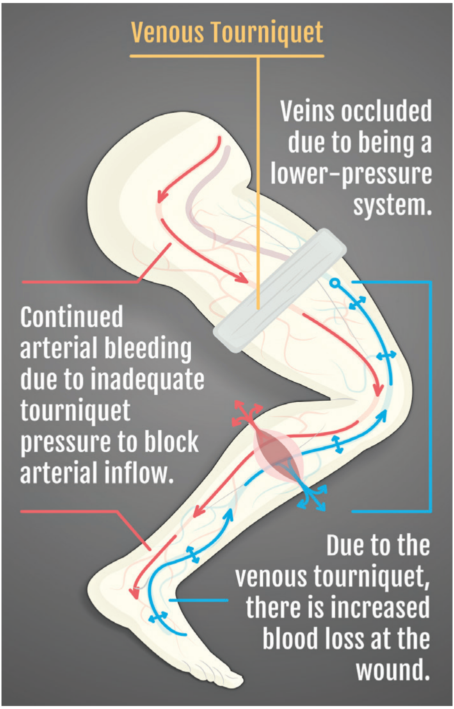

Venous Tourniquet
Veins occluded due to being a lower-pressure system.
Continued arterial bleeding due to inadequate tourniquet pressure to block arterial inflow.
Due to the venous tourniquet, there is increased blood loss at the wound.

Figure 4.4: A venous tourniquet shows continued arterial blood flow to limb and loss of blood at wound. Veins are compressed, preventing any blood return to the heart.

Improvised Tourniquet Strap Requirements

- Width: Must be at least 2 inches in width. Otherwise, there is not enough tissue being compressed to effectively stop bleeding.
- Strength: Must be made of material strong enough not to rip or tear apart when constriction force is applied by the windlass. In addition, it must not be elastic or stretchable material.
- Length: Must go around the extremity and have enough extra material or slack—6 inches ideally—to insert and turn the windlass to cause constriction. Again, the improvised tourniquet material must not be elastic or stretch (Figure 4.5).

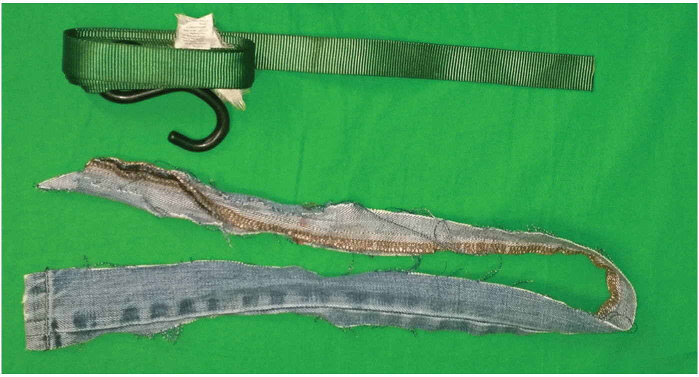


Figure 4.5: Examples of suitable tourniquet-strap materials include a piece of a ratchet strap and an inseam strip from a pair of blue jeans.

Examples of bad tourniquet-strap materials:

- String, shoelaces, telephone cord, electric cord, and pieces of rope are **NOT** recommended. They are not wide enough to exert enough surface pressure to close the artery, can be very painful, and can create further damage.
- Metal, or any material that will cut into tissue.
- Stretchable material, such as a tube sock or elastic bandage.

Tourniquet Windlass Rod Requirements:

- Length: 6 to 8 inches is usually ideal—there's enough length to gain a mechanical advantage and secure after reaching proper pressure.
- Strength: Rod must be able to withstand the force of both twisting and compression.
- Secure: Have a way to secure the windlass rod so pressure does not loosen—essential so you can free your hands for other work. This can just be a string tied around the windlass, etc.

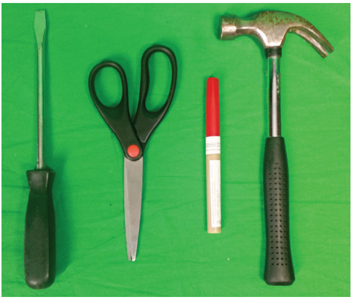


Figure 4.6: Examples of suitable windlass rods include a screwdriver, a pair of scissors, a sturdy pen or marker, and a hammer.

Examples of good windlass rods (Figure 4.6):

- Broom handle piece.
- Thick tree branch (green, not rotted wood).
- Screwdriver.
- Scissors.
- Ratchet, pliers, hammer.
- Auto jack handle.
- Piece of wood from a broken picture frame. (Think outside of the box to find something sturdy!)
- Sturdy pen or marker.

Making an Improvised Tourniquet

Now that you know the minimum requirements for an improvised tourniquet, let's use an example of constructing a tourniquet out of blue jeans and the scissors used to cut the blue jeans. Many other common materials could be substituted.

Making a Blue Jean Tourniquet

Make the band by cutting a 2- to 3-inch strip, putting the bumpy thick seam of the blue jeans in the middle of your strip. Cut down the entire inseam of the jeans (Figure 4.7). Make sure it is long enough to wrap around the extremity with 6 to 8 inches of slack. Be sure to cut a second strip that is long enough to go around the extremity. This strip is used to secure the windlass.

- While applying direct pressure to a pressure point, wrap the extremity with the 2-inch strip at least 2 to 3 inches above the wound, pull it tight, and tie it (Figure 4.8).

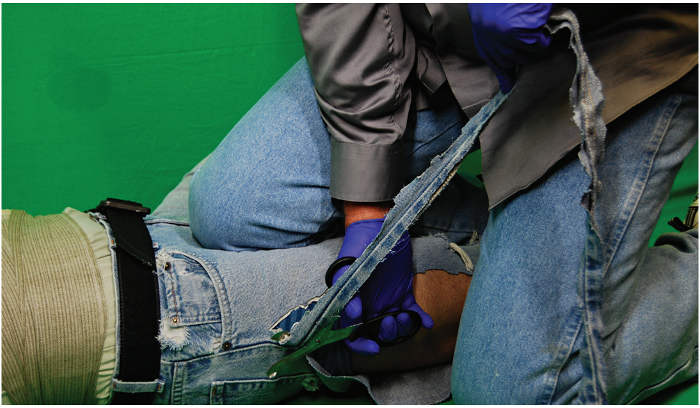


Figure 4.7: Make the band.

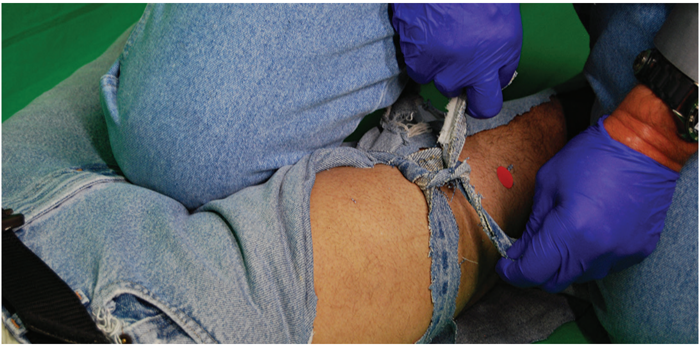


Figure 4.8: Wrap the extremity above the wound; tie a square knot for the windlass.

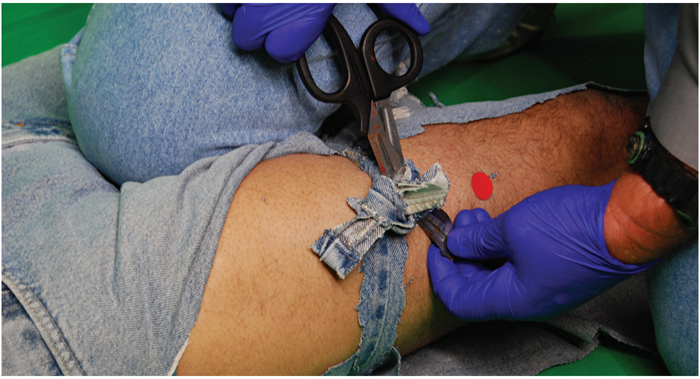


Figure 4.9: Insert windlass device and tighten.

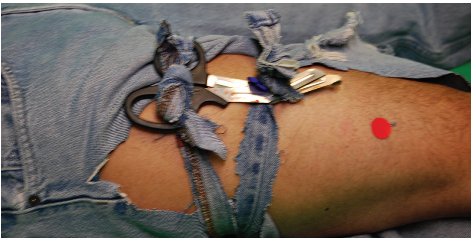


Figure 4.10: Secure windlass to maintain pressure.

- Place the windlass on top of the knot and tie a square knot. This will hold the windlass in place.
- Turn the windlass until the bleeding stops. In this example, the scissors used to cut the jeans are being used as a windlass rod (Figure 4.9).
- Check the pulse and confirm that the tourniquet is working.
- Once the windlass has been satisfactorily tightened and the pulse is no longer present, secure the windlass rod with another piece of material as shown (Figure 4.10).

Remember, once you have applied a tourniquet and stopped the bleeding, never loosen or remove it in the field. The only person qualified to do so is a physician. The First Care Provider may substitute many common items for either the strap or the windlass, but the success of the tourniquet will depend on whether each meets the minimum necessary requirements.

S.M.A.R.C.H.R.™
M—MASSIVE ARTERIAL BLEEDING
TOOLS TO STOP THE BLEED: WOUND PACKING

We can't say it enough; first aid is about buying time for the victim, and the first priority is stopping major arterial bleeding. Of course, the type of treatment depends on where a wound occurs. We've covered tourniquets for use on extremities, and later in this chapter we'll detail how to use seals on chest wounds. Now we'll look at some problem areas—neck, armpit, groin, and upper leg—that require the First Care Provider to pack material (gauze) into the wounds and apply direct pressure until the blood clots and stops bleeding. The best way to control a hemorrhage, in the areas where tourniquet application is not possible or if the tourniquet has already been used on another injury, is to pack the wound with the gauze or packing material available and apply direct and continuous pressure to facilitate blood clotting.

What Do You Use to Pack a Wound?

What you use to pack a gunshot wound that is squirting or pooling bright-red blood depends on what you have available. Your first choice should be one of the many gauzes that are manufactured with a hemostatic agent. This gauze should always be in your blowout kit.

If you don't have hemostatic gauze, use regular gauze. There are many forms of gauze on the market that are compact and can be carried in a first aid kit without taking up very much space. If you have neither available, improvise. Use a t-shirt, towel (preferably white, so you are able to evaluate if the direct pressure is slowing or stopping the bleeding), or other absorbent fibrous material. You must pack a massive arterial hemorrhage; it will not clot on its own. Pack it deep and apply pressure. You must pack the wound deep and "to the bone." Pack the entire wound cavity as tightly as possible. Apply direct pressure to the dressing until the bleeding stops if non-hemostatic packing is used, or for 3 minutes if hemostatic gauze is used.

What is Hemostatic Gauze?

Hemostatic gauze is a first aid miracle that came into full use on the battlefield in the last two wars. It prevented a lot of deaths from massive arterial hemorrhages in Iraq and Afghanistan.

Hemostatic gauze is manufactured with a compound that accelerates the blood-clotting process, thereby helping to prevent blood loss. There are two classes of material that are currently approved by CoTCCC. The first is QuikClot Combat Gauze, manufactured with kaolin. Kaolin is an inorganic mineral that activates the clotting cascade and promotes blood clotting.

The second class of material involves gauze and a chitosan material. Chitosan is derived from shellfish. When the chitosan-based gauze is packed into the wound, it interacts with blood to form a gel-like membrane that helps stop bleeding. It is of note that here has never been a reported reaction to chitosan-based gauze by people with shellfish allergies.

The hemostatic gauzes are packed directly into the wound. By doing so, you are also applying the blood-clotting agent directly to the bleeding source in one step, thus saving valuable time in stopping blood loss. As with tourniquets, the different hemostatic gauzes should be used carefully and applied according to the manufacturer’s instructions and warnings. Get several and keep them in your blowout kit.

What Does a Hemostatic Agent Do?

When a hemostatic agent comes in contact with blood, there is a chemical reaction that accelerates blood clotting or forms a gel-like membrane to promote blood clotting, depending on the type of hemostatic agent used. Hemostatic agents are ideal when a wound is located on the body where controlling bleeding is difficult with direct pressure or with a tourniquet. These locations include wounds on the neck, groin, axilla (armpit), or high up on extremities near the torso.

Hemostatic agents, in addition to being manufactured on rolls of gauze, are also available in powdered form. However, the powdered form of these agents is no longer recommended by either the TCCC or the TECC. We strongly recommend that you select only the hemostatic gauze for your blowout kit. The hemostatic gauzes are manufactured in different lengths. Remember, it is always better to have too much hemostatic gauze than too little. The recommended length is a minimum of 4 yards.

If you do not have a massive arterial bleed, use regular gauze to pack the wound and apply direct pressure.

If you have a massive bleed that is not suitable to tourniquet application, wound packing with a hemostatic gauze is the preferred method of treatment, followed by packing with non-hemostatic gauze above the level of the skin.

When Should a Hemostatic Dressing be Used? Not Used?

Hemostatic dressings should be used for massively bleeding wounds where a tourniquet cannot be applied. These would include wounds to the groin area, the armpit (axilla), and the neck. If a patient has multiple extremities that have massive bleeding wounds, then the hemostatic dressing could be used on one of the other extremities after the available tourniquets have been used.

Hemostatic dressings **SHOULD NOT** be used to pack an abdominal wound or dress penetrating head wounds.

How Do I Properly Pack a Wound Using a Hemostatic Gauze?

If your victim has a massive arterial hemorrhage to the neck, armpit, or groin, you must pack the wound. To pack a gunshot wound properly, first you need to expose the wound and identify the bleeding. Open the clothing around the wound to visually identify the severity of the gunshot wound and see which type of bleeding is associated with it.

If arterial bleeding is present, you will have bright-red squirting or pooling blood in the wound cavity. You must remove as much excess blood as possible by either blotting with regular gauze or a towel or scooping out the blood with your fingers. This will allow you to visually identify the bleeding source better within the wound cavity. Make sure to preserve any clots that have already formed within the wound cavity. While holding

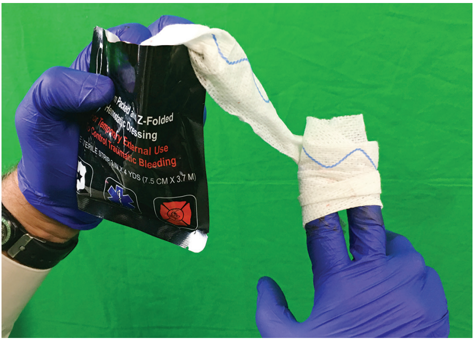

Z-Folded
Hemostatic Dressing
For Temporary External Use
To Control Traumatic Bleeding
STERILE STRIP 3IN X 4 YDS (7.5 CM X 3.7 M)

Figure 4.11: Wrap 6 inches of gauze around two fingers to pack deeply into a wound.

direct pressure on the pressure point associated with the wound, prepare the hemostatic gauze for use. Wrap about 6 inches of hemostatic gauze around the tip of two fingers in preparation to begin packing at the bleeding source (Figure 4.11).

Put the two fingers with the hemostatic gauze as deeply in the wound as possible to get to the bleeding source. Try to get right on top of the severed artery. During the packing process, it is important to use two hands to pack the gauze. Direct pressure **MUST** be maintained on the gauze during the packing process.

Pack the entire wound cavity with the remaining hemostatic gauze as tightly as possible. Hold direct pressure for at least three minutes to ensure that the hemostatic agent is forming the needed clot, the arterial bleeding has been controlled, and hemostasis has been achieved.

Pack these wounds tightly to create a cone of pressure from the surface to the bleed source. The saying in the TacMed community is “pack the wound to the bone,” which simply means, pack the wound cavity as completely and as tightly as possible. You can assess whether clotting is happening by watching the gauze. The bleeding is under control when the gauze is no longer getting blood soaked, and no blood is pooling within the wound cavity. Never lift the gauze up to see if the bleeding continues. You will only pull apart the developing clot.

Once packed, leave the hemostatic gauze in place. After packing the wound, a pressure (trauma) dressing will be applied. However, for the pressure dressing to be successful, the wound cavity must be completely packed to slightly above the level of the skin. Therefore, after achieving hemostasis (stopping the bleeding) with the hemostatic gauze, continue to pack regular gauze in the wound until the dressing is slightly above the level of the skin. While doing so, be sure to keep continuous direct pressure on the wound dressings.

Once the wound has been completely packed to slightly above the level of the skin, a trauma dressing will be applied to continue putting pressure on the wound.

The basic wound-packing techniques are the same for extremities, groin wounds, neck wounds, and wounds of the axilla (armpit). As an example, let's do the step-by-step wound packing of massive arterial bleeding from an axillary wound (Figures 4.12 to 4.21).

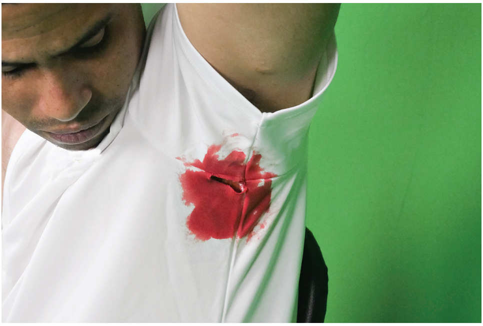


Figure 4.12: An axilla, or armpit, wound.

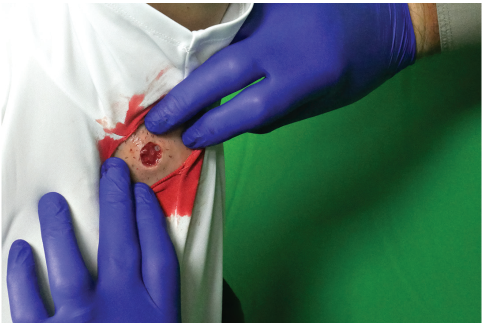


Figure 4.13: Expose the wound.

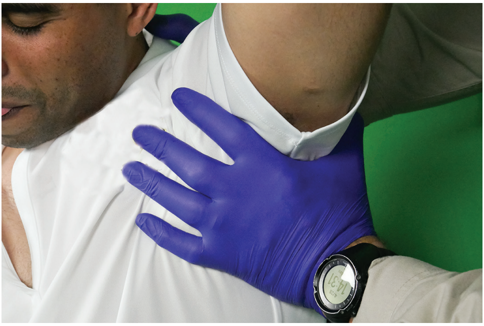


Figure 4.14: Apply direct pressure while preparing to pack the wound.

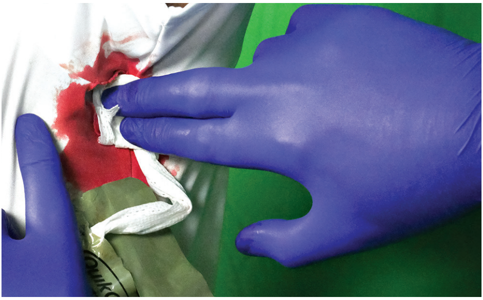


Figure 4.15: Pack the wound as tightly as possible.

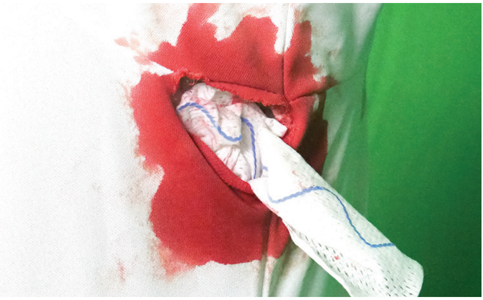


Figure 4.16: Be sure to pack the wound above the level of the skin.

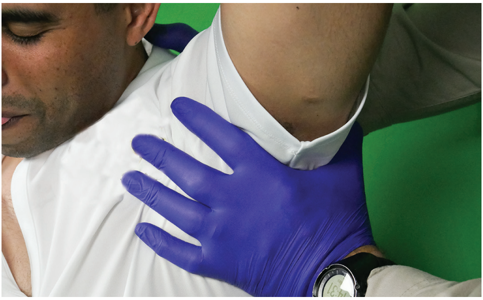


Figure 4.17: For hemostatic gauze, apply direct pressure for at least 3 minutes. For regular gauze packing, apply direct pressure until the bleeding stops.

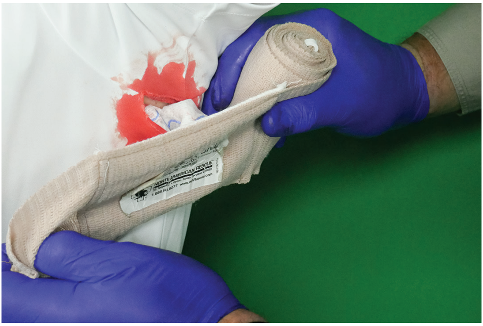


Figure 4.18: Wrap the packed wound with a trauma bandage.

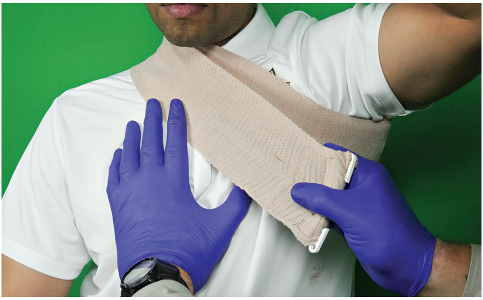


Figure 4.19: Wrap under arm, across back, across the neck and chest. Continue until bandage is completely wrapped.

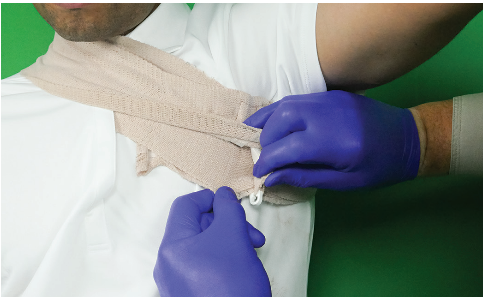


Figure 4.20: Completed bandage.

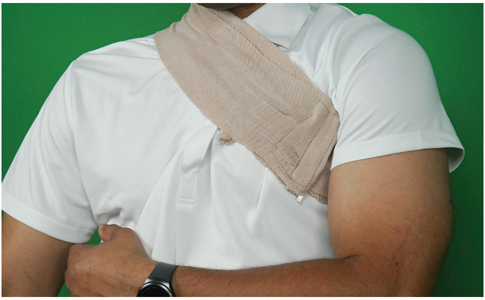


Figure 4.21: With an armpit wound, have patient self apply more direct pressure by squeezing arm to side.

Applying a Pressure Dressing to the Neck

Applying a pressure dressing to a neck uses the same technique as the one for applying a bandage to the axilla wound. Pack the neck wound (if there is massive arterial bleeding), apply the trauma bandage to the wound site on the neck, and then follow the technique shown (Figures 4.13 to 4.20). Have your victim sit up, if conscious, and a spinal cord injury is not present. Place the sterile dressing pad on the wound (Figure 4.22) and have the victim raise the opposite arm on the uninjured side.

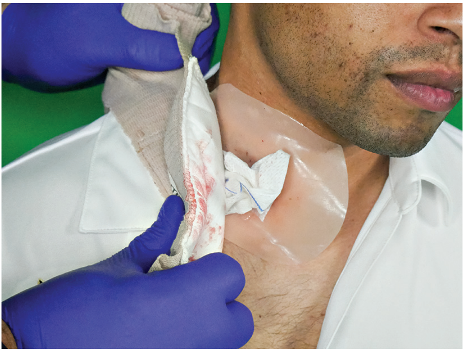
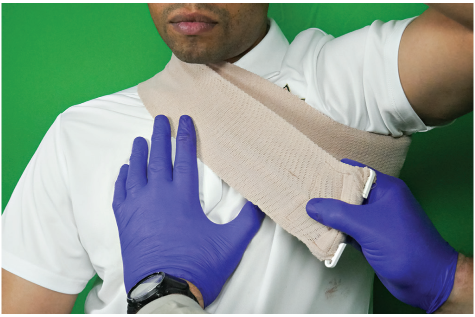


Figure 4.22: Sterile bandage on wound.

Place the dressing over the wound, making sure no pressure is transmitted to the trachea. Pressure on the trachea will restrict the victim's airway.

Wrap the trauma dressing across the chest and under the opposite armpit. Pass the bandage across the back, over the neck wound, across the chest, and under the opposite armpit, across the back, and continue until the bandage is secured to itself (Figure 4.23).

Figure 4.23: Trauma dressing goes under opposite arm; no pressure on trachea.



This technique provides maximum pressure to the wound site without restricting the victim's airway. If the victim is unconscious, you can still perform this technique, but it takes a little more time because you must pass the bandage between the victim's back and the surface on which the victim is lying.

What is a Trauma Dressing? What is the Difference Between a Pressure Dressing and a Trauma Dressing?

A trauma dressing is basically an elastic bandage that has a flat sterile dressing pad sewn into it (Figure 4.24). The dressing is a sterile, absorbent material that is placed over the wound to protect it. Elastic compression-style bandages are a significant improvement over traditional non-elastic bandages. The newer dressings also feature Velcro strips every few inches on the bandaging material to tightly secure the dressing as it is applied. If you drop the bandage roll while wrapping, not only does the dressing stay secure to the wound site, but it also does not unroll on the floor. These new trauma dressings are user-friendly, can be applied very quickly because of the one-handed application feature, and are very efficient at creating compression.

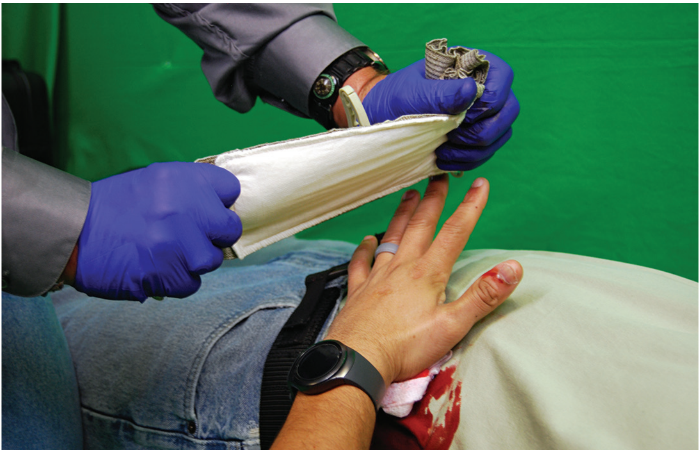


Figure 4.24: Trauma bandage with attached sterile dressing.

Wound packing occurs when gauze is packed directly into the wound to place direct pressure on the bleeding source. The wound packing is then wrapped with a trauma dressing. The combination of wound packing and an encircling trauma dressing is called a pressure dressing.

Sequential wrapping of the elastic trauma dressing generates a compressive force that, when combined with gauze packing, creates an extremely efficient and effective pressure cone on the wound site (Figure 4.25).

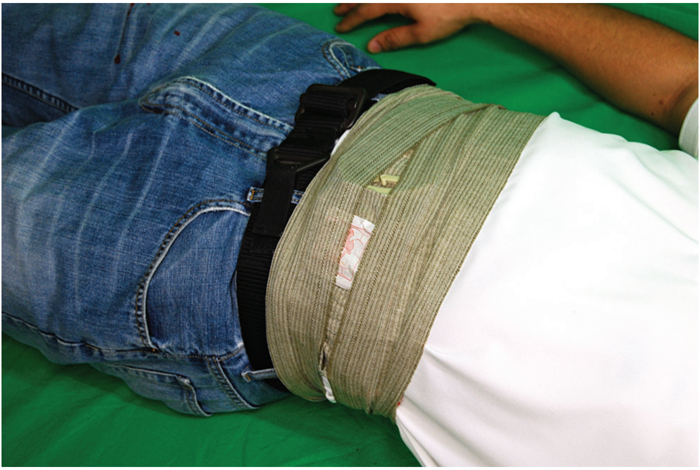


Figure 4.25: Trauma dressing wrapped on an abdomen.

Special Note: Treating Abdominal Wounds

The sequence for treating an abdominal wound without an evisceration is straightforward: Apply direct pressure, followed by a trauma dressing or chest seal.

With an abdominal wound evisceration, in which intestines and other internal organs may spill outside the body, the First Care Provider has a choice to make. The Provider can place the contents back into the body cavity and cover the hole in the skin surface with an abdominal dressing or a trauma dressing. But pushing the guts back inside the body feels like pushing on warm spaghetti. Naturally, some people may be squeamish about that (Figure 4.26).

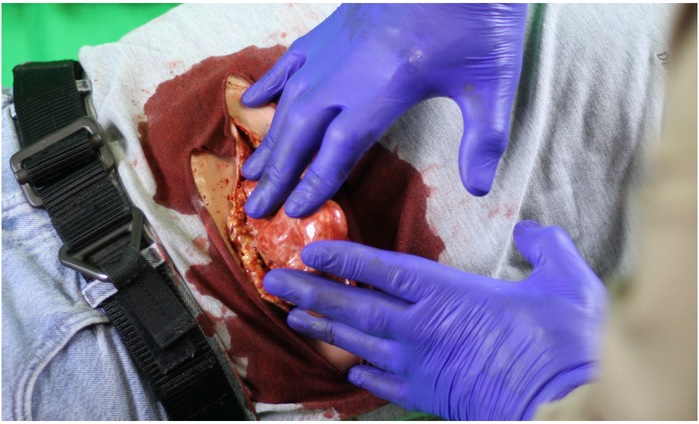


Figure 4.26: Gently push eviscerated organ back in.

The alternative, then, is not to replace the contents, but instead cover them with a moist waterproof nonadhesive dressing (plastic bag, trash bag, piece of a rain poncho) and a second covering bandage (Figure 4.27). Then wrap with a trauma dressing or an improvised dressing. There are also commercially available abdominal trauma dressings that are lined with plastic to prevent eviscerated organs from drying out.

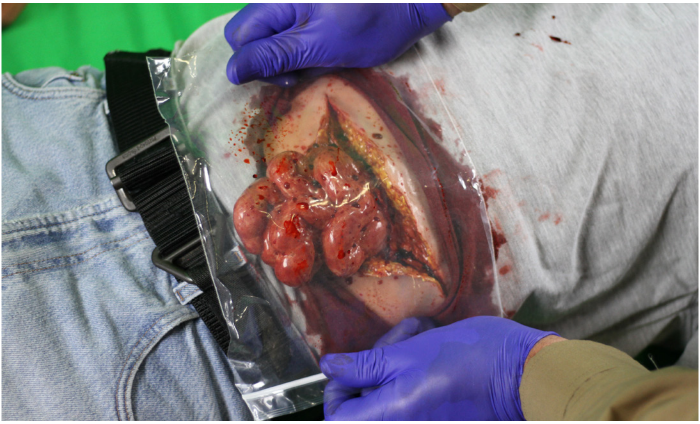


Figure 4.27: If unable to push organs in, cover and keep moist.

It is vital to note that the Provider does **NOT** try to pack a penetrating abdominal wound (with or without an evisceration). Also, do **NOT** allow exposed organs to be covered with adhesive tape or the adhesive of a chest seal. Adhesive will stick to exposed organs and cause more damage.

What if the Victim has a Spinal Cord Injury?

If your victim complains of paralysis, tingling of extremities, or numbness, a spinal cord injury is likely present. In this case, you or someone else must keep the victim's head still by holding it with both hands. Keep the victim's head completely still until EMS arrives.

S.M.A.R.C.H.R.™

A—AIRWAY

TECHNIQUES AND TOOLS FOR CREATING AN OPEN AIRWAY

Most simple airway compromises can be fixed by repositioning the head to open the airway. The most common cause of airway obstruction in an unconscious victim is the tongue. When a victim is unconscious, or in a relaxed state, and lying on his back, the tongue can fall to the back of the throat, blocking the airway. Repositioning the victim's neck or head and performing a finger sweep usually solves the problem.

First: Reposition Head

Simply reposition the head to ensure the anatomy of the airway is open and straight. This works most of the time and will be used more in unconscious victims than conscious ones. Sometimes with an unconscious victim, the head will end up in a position that restricts the victim's airway. Reposition the head and fix the problem. Look, listen, and feel to ensure the victim is moving air.

Second: Sweep the Mouth

Perform a finger sweep of the mouth to ensure that any foreign bodies are removed that could potentially obstruct the airway. While performing a finger sweep, use a hooking motion with your finger so that you ensure the tongue is correctly positioned in the mouth. Open the mouth of the victim and insert one or two fingers in the mouth. Using a hooking motion, clear the tongue by pulling it forward and removing any debris that is blocking the airway (Figure 4.28).

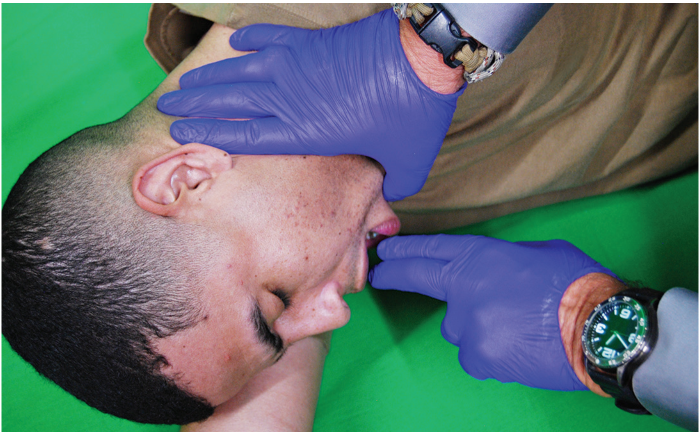


Figure 4.28: Mouth sweep.

A flaccid tongue can obstruct an airway in an unconscious victim. By performing this technique, the problem can be corrected and the airway opened.

Third: Head Tilt/Chin Lift

Note: If neck trauma is suspected, this procedure should NOT be done. See next step.

One hand is placed on the forehead and the head is tilted up (Figure 4.29). The fingertips of the First Care Provider should be placed in the soft spot under the chin and the lower jaw is pulled forward and upward. The

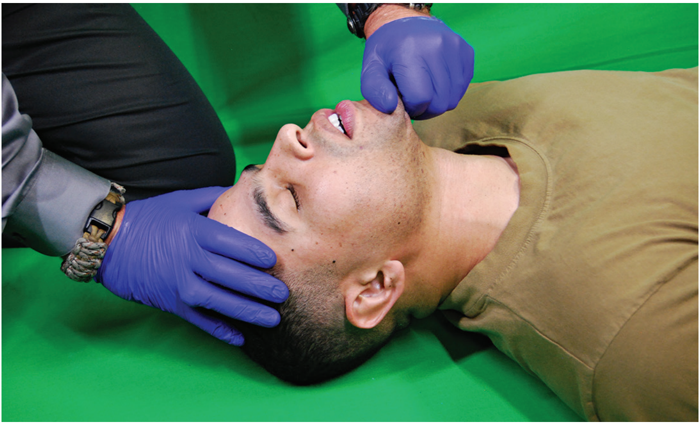


Figure 4.29: Chin lift.

mouth is then opened by pulling forward on the victim's lower lip with the hand that is lifting the chin.

Fourth: Jaw Thrust

The jaw-thrust technique helps open the airway not only in unconscious victims but also in victims that you suspect have sustained a cervical spine injury. This technique opens the airway without putting strain on the cervical spine and allows you to hold the head still and in proper alignment with the anatomy of the spinal cord.

This method of opening a victim's airway is used when there is an indication (by mechanism of injury) of a possible neck injury. The First Care Provider kneels at the back of the head of the victim. While stabilizing the victim's face, the First Care Provider places his or her index fingers behind the angle of the victim's jaw on both sides and pushes the jaw skyward from behind. This position must then be held (Figure 4.30).

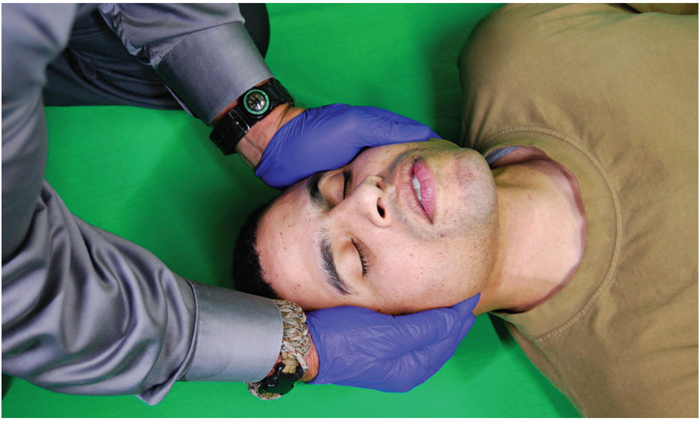


Figure 4.30: Executing the jaw thrust.

This method physically lifts the tongue away from the back of the throat. This maneuver is very fatiguing for the First Care Provider and is difficult to maintain for extended periods of time. This maneuver also occupies both hands, thus preventing treatment of other injuries. In this situation, seek assistance from a bystander or a range safety officer.

What if These Techniques Did Not Work?

If you have no success in re-establishing the airway using the previously discussed techniques, you must turn to the tools in your blowout kit to attempt to achieve an open airway.

Fifth: A Temporary Airway

The tool you will reach for in your toolbox is the nasopharyngeal airway or NPA (Figure 4.31).

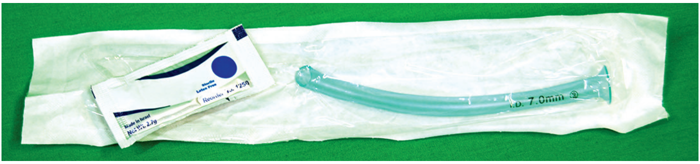


Figure 4.31: NPA (Nose trumpet).

Do not use an NPA on a victim with a skull fracture. There could be a compromise to the base of the victim's skull (basilar skull fracture) that could allow you to push the NPA tube into the brain. Signs and symptoms of a basilar skull fracture are blood or clear fluid coming from the ears or clear fluid running from the nose. Again, do NOT deploy an NPA if your victim has these symptoms.

What Size?

Selecting the properly sized NPA is important, but simple. The average diameter of the airway used in an adult is about 25-28 Fr. (The unit of measurement is called "French.") The length of the airway is generally 3.5 to 4.5 inches, but can be adjusted.

How Do I Properly Use an NPA?

First, remove the NPA from the package. Size the NPA by placing it against the side of the victim's face with the flared end at the nostril. Cut the length so that it reaches the earlobe. Use the natural curvature of the NPA to follow the underlying anatomy of the human airway.

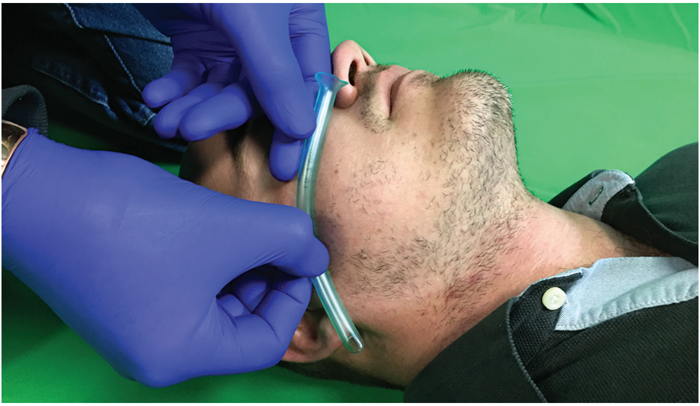


Figure 4.32: Measure.

As seen in the first image (Figure 4.32), the NPA is slightly longer than needed. The excess length is cut off (Figure 4.33). When doing so, be sure to cut at the same bevel and angle as the end of the NPA.

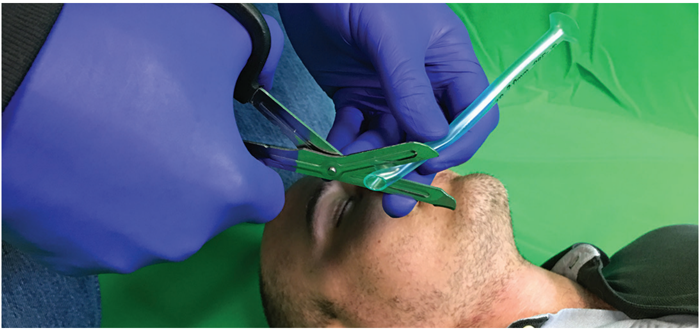


Figure 4.33: Trim.

Make sure that you lubricate the outer surface of the NPA before inserting it into your victim's nostril (Figure 4.34). If you do not have a pack of surgical gel, then use saliva or blood from your victim to lubricate the airway. If you try to insert this airway dry, it will induce a nasal bleed in the victim.

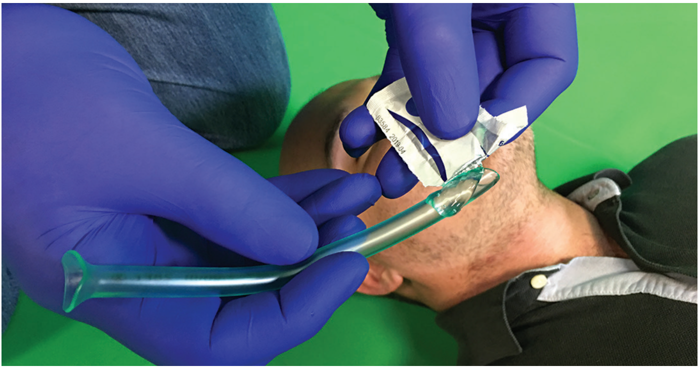


Figure 4.34: Lubricate.

With the bevel of the NPA facing toward the septum (tissue that separates the nostrils in the nose), insert the NPA into the right nostril of your victim at a 90-degree angle (Figure 4.35). The right nostril is slightly larger in most people, so that is why we attempt the right nostril first.

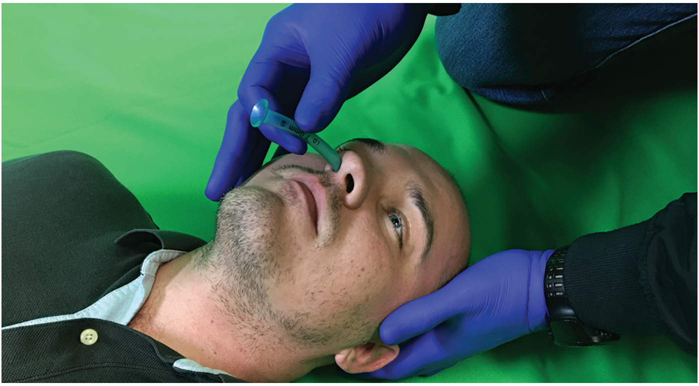


Figure 4.35: Insert.

Insert the NPA into the right nostril of your victim at a 90-degree angle to the face.

Advance the NPA into the nostril all the way to the trumpet-shaped opening at the top end of the airway (Figure 4.36). If you attempt to advance the NPA and meet resistance, remove it and try the other nostril. Once the flare of the NPA is seated against the nostril, it is stable and will remain in place without taping.

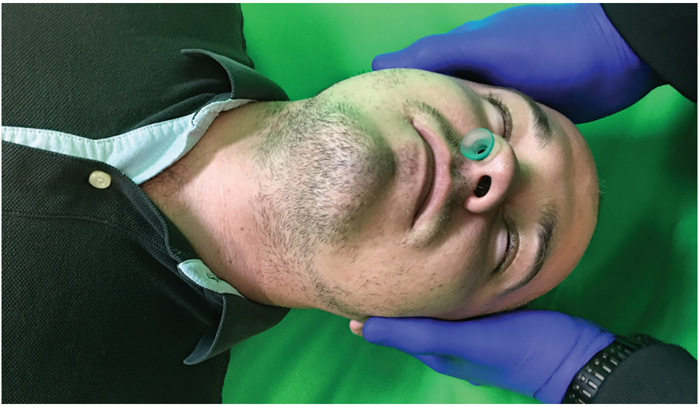


Figure 4.36: NPA complete.

If you do get a gag reaction from your victim after the NPA is fully inserted, simply retract the NPA until the gagging stops. At this point, the flare on the NPA will not be seated at the nostril and will be unstable. To prevent loss of position, it is necessary to tape the NPA in place.

Right or Left Nostril

Note: If you must use the left nostril while inserting the NPA, you must still face the beveled end of the airway toward the septum of the nose. This means your airway curvature will be opposite of the natural anatomy of the airway. To change this, you simply rotate the NPA 180-degrees clockwise while advancing the NPA into the airway. Make sure you advance the NPA at 90 degrees and do not try to follow an imaginary curvature. Insert the NPA straight in at 90 degrees and sink it. The quicker you perform this action, the more comfortable it is for the victim.

S.M.A.R.C.H.R.™
R—RESPIRATIONS:
COMMERCIAL CHEST SEAL

What is a Chest Seal?

A chest seal is a dressing that is applied to entry and exit wounds on the chest to prevent air from entering the chest cavity. They are typically made of a plastic type of material. Chest seals may be improvised or commercially manufactured. The commercially manufactured chest seals have been evaluated by the ISR, and reviewed by the CoTCCC, prior to making recommendations for acceptance by the military.

How Do I Properly Seal a Chest Gunshot Wound?

Commercial Chest Seal

If you have one, your best tool is a commercially produced chest seal that is made of a non-permeable (airtight) material with an adhesive material on one side. The seal covers the entire wound and the adhesive sticks to the tissue around the wound to form an airtight patch preventing air from entering or escaping through the bullet hole. It works in the same manner as a patch on a bicycle tire or inflatable toy.

There are two types of commercial chest seals: Non-vented and vented.

The non-vented chest seal is a square piece of airtight material with adhesive on one side. When placed over the chest wound, it completely seals the wound, preventing air from entering or leaving the chest cavity. It works well, but there is a significant risk that a patient may develop a complication known as a tension pneumothorax, as discussed in Chapters 2 and 3. When this potentially fatal condition develops, it must be treated immediately by “burping” the wound (see also Chapter 5). This “burping” process means that one side of the chest seal is elevated, allowing the trapped air to escape from the chest cavity.

The second type of chest seal is called a vented chest seal. A one-way valve is incorporated into the design. The valve (or channel in some designs) allows accumulated air to escape from the chest (pleural) cavity. With a vented chest seal, a tension pneumothorax may still develop, but the probability is greatly reduced (10% or less probability of a tension pneumothorax versus a greater than 90% probability of a tension pneumothorax with a non-vented chest seal). Be sure to keep two vented chest seals in your blowout kit—one for the entry wound and another for the exit wound.

How Do I Properly Apply a Chest Seal?

Expose the wound to visually assess it. Tear open or cut the clothing to allow for space to apply a chest seal (Figure 4.37).

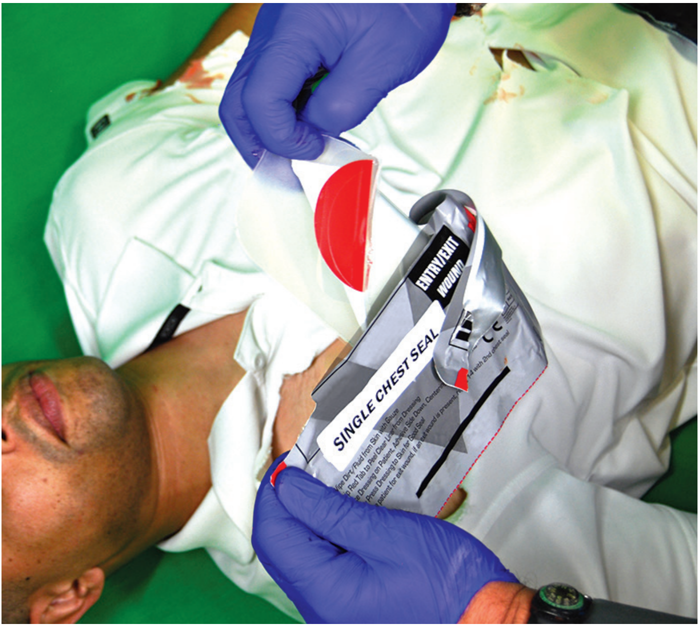


Figure 4.37: Commercial chest seal.

Open the chest seal packaging and remove the chest seal. If you're making an improvised chest seal, gather your materials and prep them for use.

Wipe away any excess blood or sweat from around the wound site so that the adhesive sticks to the skin (Figure 4.38). Peel the backing off the chest seal to expose the adhesive (Figure 4.39).

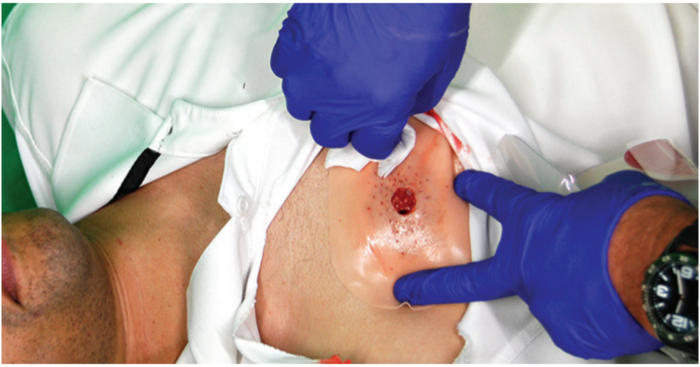


Figure 4.38: Wipe blood and sweat from around the wound.

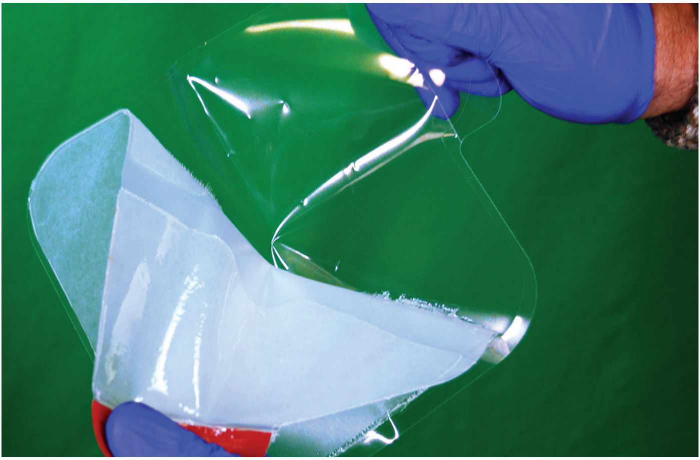


Figure 4.39: One side has adhesive.

Place the chest seal directly over the wound, centering the hole in the chest in the center of the dressing. Make sure there is at least 2 inches of coverage on all four sides. Firmly seal the dressing to the chest (Figure 4.40).

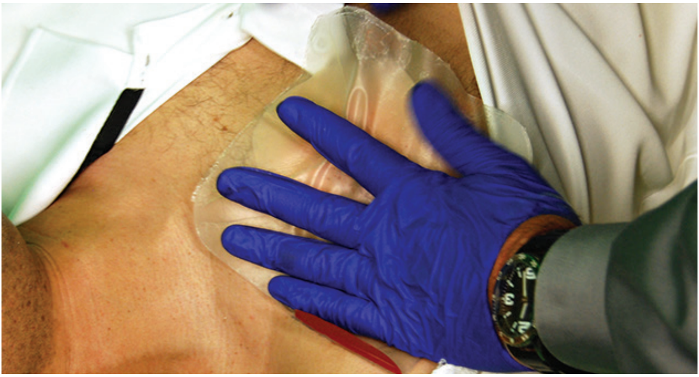


Figure 4.40: Adhesive side down.

Inspect the front, sides, and back of the torso to look for an exit wound. If an exit wound is present, then repeat the process to apply a chest seal to this wound (Figure 4.41).

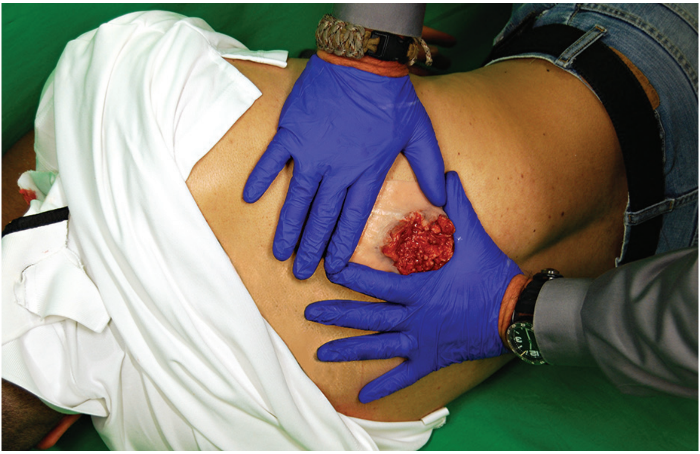


Figure 4.41: Exit wounds can be much larger than entry wounds.

S.M.A.R.C.H.R.™
R—RESPIRATIONS: IMPROVISING A CHEST SEAL

How Can I Make a Chest Seal?

If you don't have a professional chest seal, or have exhausted your supply, make one. You can make a chest seal from any non-porous material large enough to cover the wound, sealing it from the outside and preventing entry of air. Examples of improvised chest seals are a plastic sandwich bag, the cellophane from a pack of cigarettes, a piece of a raincoat, the cover of this book, etc.

The non-porous (occlusive) material can be held in place with an improvised bandage, such as duct tape (Figure 4.42).

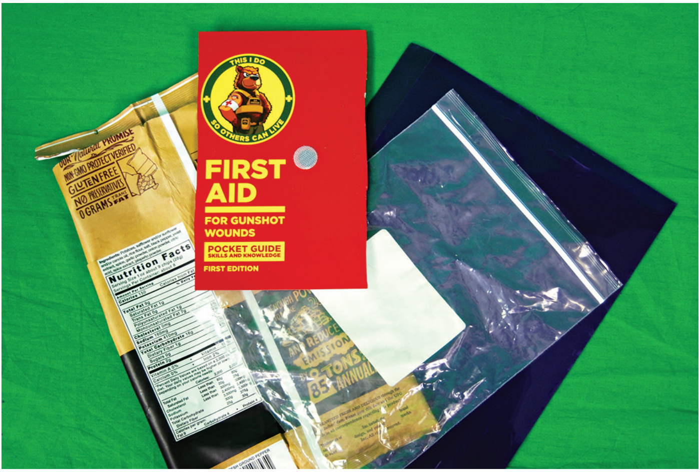


Figure 4.42: Possible improvised chest-seal materials.

We used the cover of this book as our example. We purposely made the cover and pages of this book to be waterproof, and they should work perfectly to cover large chest wounds, such as the exit wound shown previously.

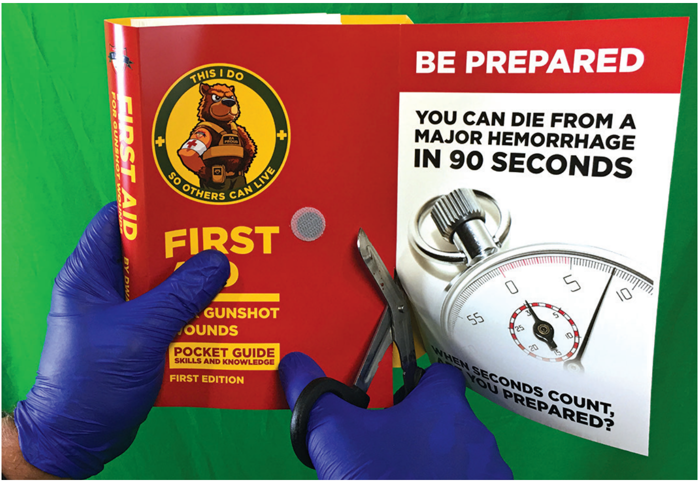

BE PREPARED
YOU CAN DIE FROM A MAJOR HEMORRHAGE IN 90 SECONDS
WHEN SECONDS COUNT, ARE YOU PREPARED?
THIS I DO SO OTHERS CAN LIVE
FIRST AID FOR GUNSHOT WOUNDS
POCKET GUIDE SKILLS AND KNOWLEDGE
FIRST EDITION

Figure 4.43: Cut large enough to cover entire wound.

Cut a large section (Figure 4.43) and place the non-permeable book cover, or other substitute, over the wound. Tape down all four sides of the book cover to the victim. Make sure the dressing is secured on all four sides and that an airtight seal is accomplished (Figure 4.44).

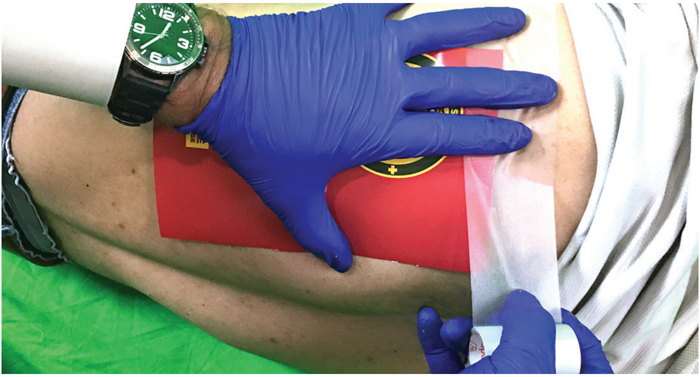


Figure 4.44: Tape all sides.

When making an improvised chest seal, you are creating a non-vented chest seal (Figure 4.45), and you must be aware of the possibility of the patient developing a tension pneumothorax.

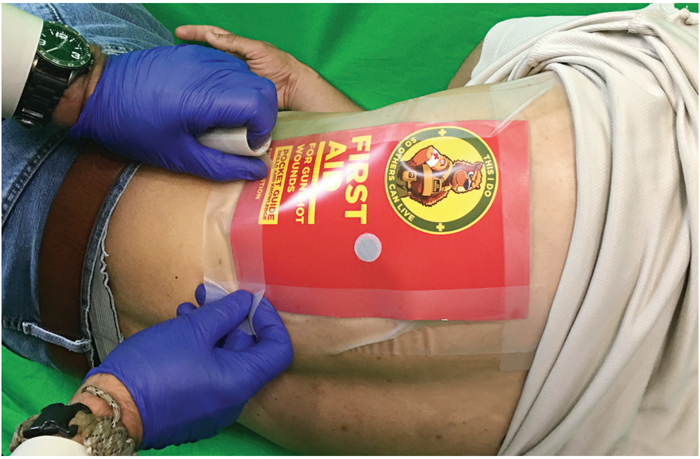


Figure 4.45: Ensure a good seal.

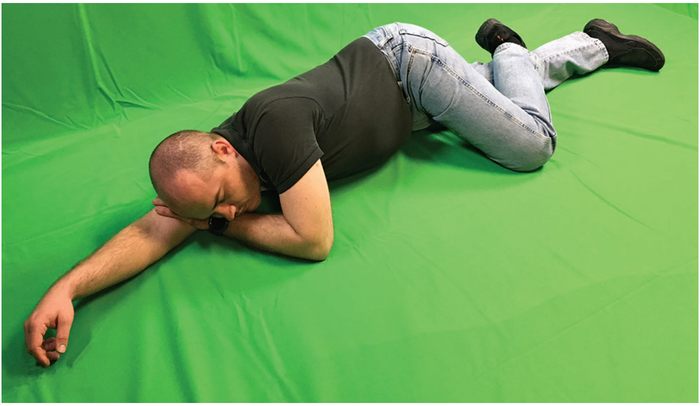


Figure 4.46: Recovery position.

Roll your victim into Recovery Position, described later in this chapter (Figure 4.46). Monitor the victim for the symptoms of a tension pneumothorax.

How Do I Burp a Non-Vented Chest Seal?

If the victim starts developing the signs of a tension pneumothorax as described in Chapter 3, after you have sealed the chest wounds with a non-vented chest seal, you must "burp" the chest seal to expel the pressured air bubble. This is simply done by lifting a corner of the chest seal (Figure 4.47) to allow pressurized air to escape. Allow the chest seal to remain unsealed until the victim's breathing improves (see Chapter 5). Thereafter, the chest seal should be resealed, and the First Care Provider continues to monitor the patient for further breathing difficulties.

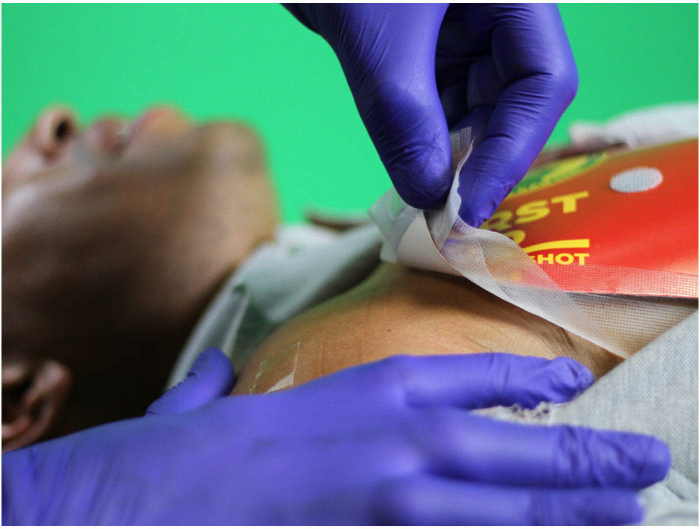


Figure 4.47: Chest seal burping.

S.M.A.R.C.H.R.™
C—CIRCULATION

At this point in the S.M.A.R.C.H.R.™ protocol, attention is directed to identifying other wounds and sources of bleeding that are not massive arterial hemorrhages. Trauma dressings, gauze wound-packing methods, and improvised dressings are appropriate at this stage. The goal is to prevent further significant blood loss from any other wounds that may have occurred. The tools for controlling other bleeds are simply gauze and pressure until clotting occurs.

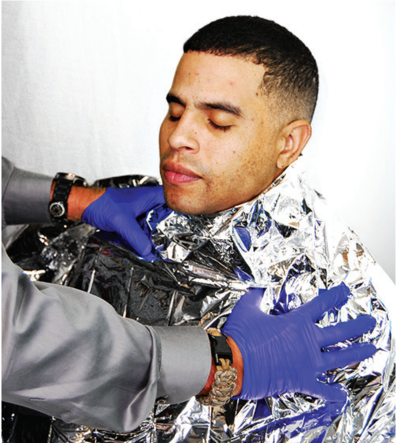
S.M.A.R.C.H.R.™
H—HYPOTHERMIA
TOOL TO KEEP BODY HEAT

Hypothermia is the condition that occurs when body temperature falls below 95° F. While this may seem a small difference, as the body's temperature falls, several events occur within the body as the body tries to self-regulate the temperature back to 98.6° F.

When blood loss occurs, the body decreases the amount of blood going to the extremities (which are normally cooler than the torso or core). While this preserves more warm blood for the core of the body, the decreased blood flow to the extremities means that the blood stays longer in the extremity and is therefore cooler when it returns to the core. This tends to further lower the core temperature of the body. As the temperature drops, the ability of the blood to clot decreases. This actually results in increased blood loss due to the inability of the blood to clot because the body temperature begins to fall below the optimal 98.6° F.

In addition, environmental factors must be considered. If a person is in air-conditioned space, then the surrounding air may only be 72° F and more body heat

Figure 4.48: Mylar survival blanket.



is lost to the surrounding air. If clothes are removed to dress wounds, more body heat is lost. If the person is lying on a wet surface or a tile floor, more heat is lost. This heat loss is normal because heat flows from warm areas to cooler areas. The result is hypothermia, which further increases the fatality rate.

What Can I Do to Warm the Victim?

Attempt to keep the victim warm by covering them with blankets or other warm clothing. We also highly recommend that your blowout kit contain a "mylar" or space blanket. They are small and will fit in a reasonable size kit. If you are indoors, turn on the heat to attempt to preserve the victim's body temperature and keep the victim covered. Try to place something beneath them to prevent heat loss to the ground/tile. Wrap their head in clothing or material to prevent heat loss to the air.

Other Forms of Hypothermia

Note that in this section we are only considering hypothermia caused by blood loss. We are not considering hypothermia caused by the environment, cold, or rain in the absence of blood loss. Some of the first aid treatments for hypothermia caused solely by environmental conditions are not applicable to the hypothermia caused by blood loss.

S.M.A.R.C.H.**R.**™
R—RECOVERY POSITION TECHNIQUE

The Recovery Position is the preferred position in which a severely injured casualty is placed to allow for protection of the airway due to vomiting, chest wounds, or possible seizures.

Place the victim on his or her side in a three-quarters prone position as follows (Figure 4.49):

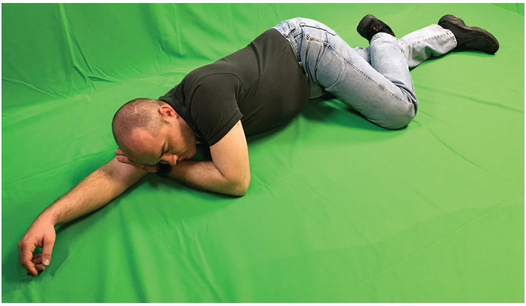


Figure 4.49: Recovery Position.

- With the person lying on his or her back, kneel on the floor at the injured person's side;
- Place the arm nearest you at a right angle to the body with the hand upward, toward the head;
- Tuck the person's other hand under the side of the head, so that the back of the hand is under the person's cheek;
- Bend the knee farthest from you to a right angle;
- Carefully roll the person onto his or her side by pulling on the bent knee;
- The bottom arm should be supporting the head, and the top arm will stop you from rolling the victim too far;
- Open the airway by gently tilting the head back and lifting the chin, and check that nothing is blocking the airway;
- Stay with the person and monitor his or her condition until help arrives.

If a spinal injury is suspected, or indicated by the mechanism of injury, excessive movement may increase the severity of the injuries. The airway must be protected, but the patient cannot be rolled into a Recovery Position until trained medical personnel take over.

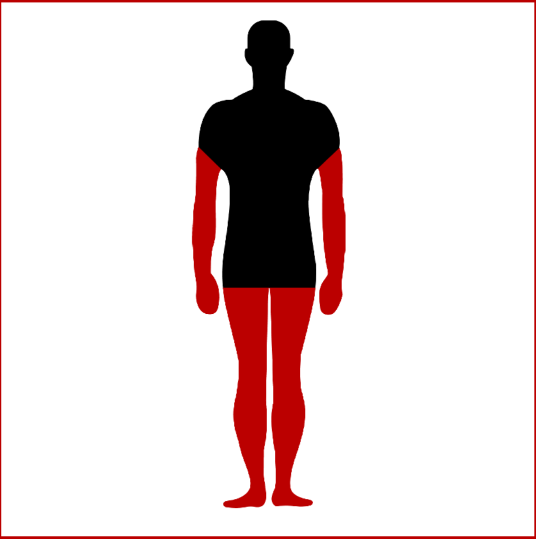
The Miscellaneous Tools in the Toolkit

Other items included in your kit can be used as follows:

- The inexpensive Mylar survival blanket is excellent for wrapping a patient and fighting the effects of hypothermia.
- Trauma shears make cutting clothing and exposing the wounds much easier.
- Gloves are necessary for personal protection against blood-borne diseases.
- The resealable plastic bag can be used for an improvised chest seal.
- Tape is necessary to attach an improvised chest seal.
- The permanent marker allows for marking the time of tourniquet application.
- A flashlight is handy because you never know when you will be in the dark due to nightfall or a power outage.

FIRST AID FOR

GUNSHOT WOUND LEG OR ARM



GUNSHOT WOUND
LEG OR ARM

S.M.A.R.C.H.R.™

- ✓ **SAFETY**
  - **SECURITY**
  - **911**
- ✓ **PERSONAL PROTECTION EQUIPMENT**

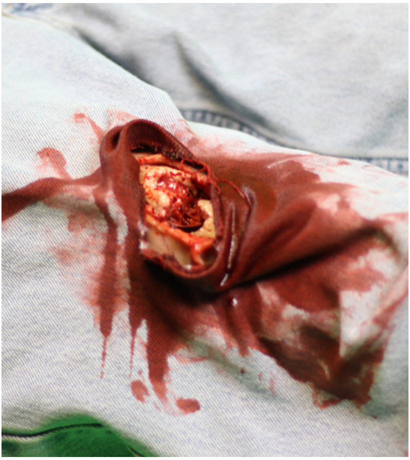
GO

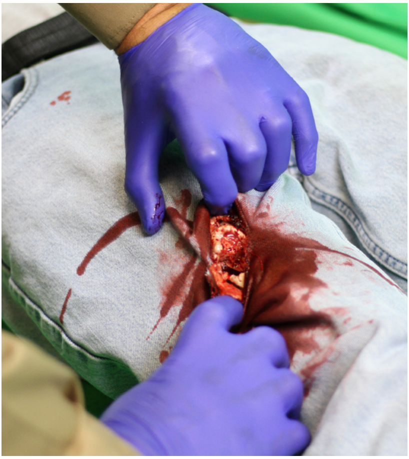
HOW TO TREAT A GUNSHOT WOUND

TO THE LEG OR ARM

1

- LOCATE AND EXPOSE WOUND



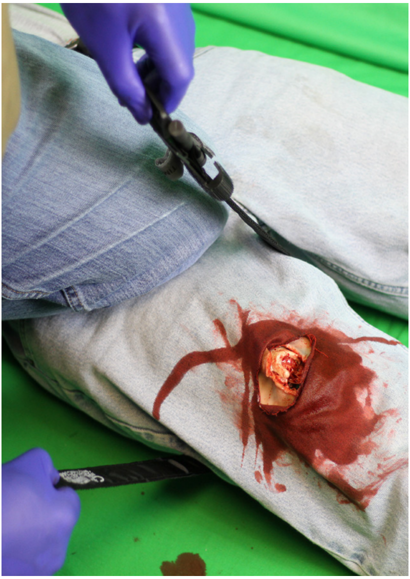


HOW TO TREAT A GUNSHOT WOUND

TO THE LEG OR ARM

2

- APPLY DIRECT PRESSURE TO PRESSURE POINT



3

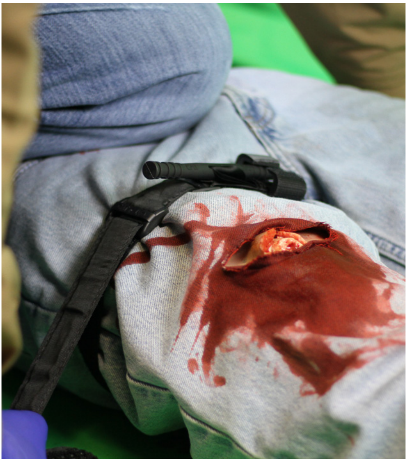
- WHILE KEEPING DIRECT PRESSURE ON PRESSURE POINT, APPLY TOURNIQUET 2 TO 3 INCHES ABOVE WOUND

HOW TO TREAT A GUNSHOT WOUND

TO THE LEG OR ARM

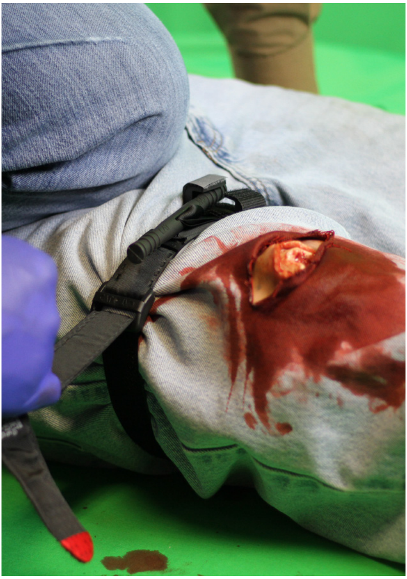
4

- KEEP DIRECT PRESSURE
- PLACE STRAP THROUGH 1ST SLOT IN BUCKLE



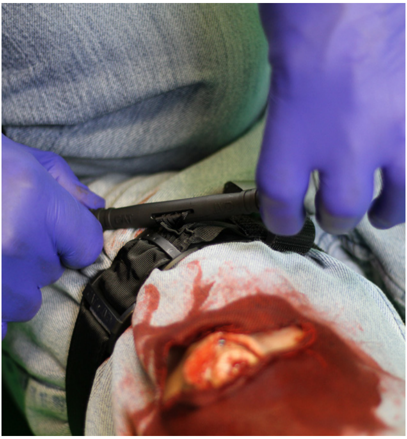
5

- WHILE KEEPING DIRECT PRESSURE, PULL RETENTION STRAP AS TIGHT AS POSSIBLE



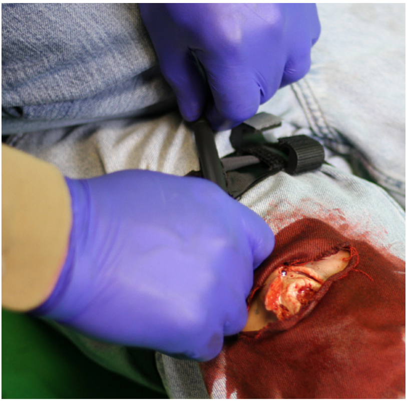
HOW TO TREAT A GUNSHOT WOUND

TO THE LEG OR ARM



6

- WHILE KEEPING DIRECT PRESSURE, TURN WINDLASS AS TIGHTLY AS POSSIBLE

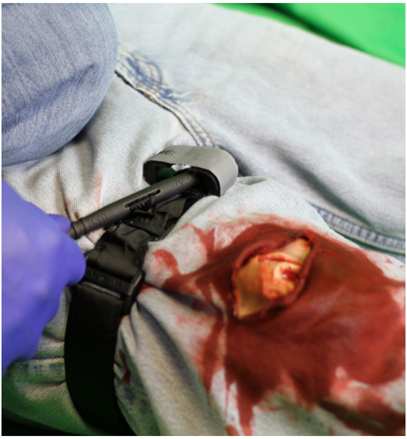


HOW TO TREAT A GUNSHOT WOUND

TO THE LEG OR ARM

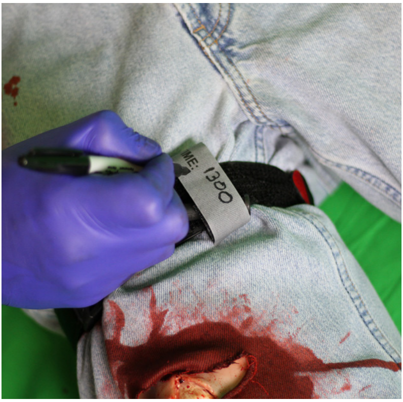
7

- SECURE WINDLASS
- RELEASE DIRECT PRESSURE
- CHECK PULSE
- CONFIRM BLEEDING HAS STOPPED



8

- MARK TIME OF TOURNIQUET APPLICATION

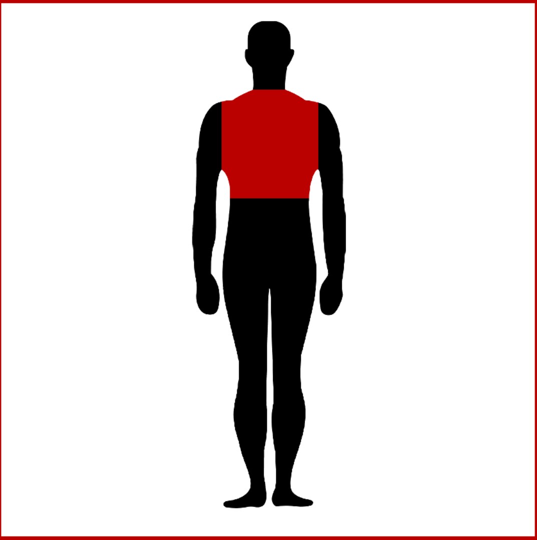


GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

FIRST AID FOR

GUNSHOT WOUND CHEST



GUNSHOT WOUND
CHEST

S.M.A.R.C.H.R.™

- ✓ **SAFETY**
  - SECURITY
  - 911
- ✓ **PERSONAL PROTECTION EQUIPMENT**
- ✓ **ALL MASSIVE HEMORRHAGE UNDER CONTROL**
- ✓ **CLEAR AIRWAY**

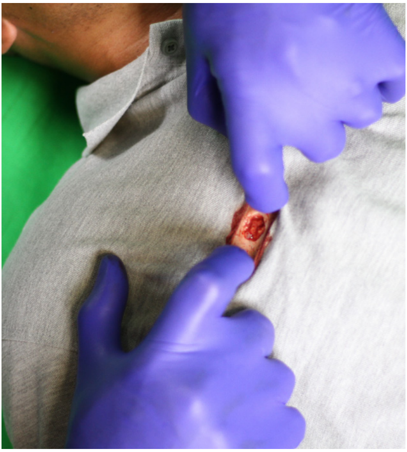
GO

HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

COMMERCIAL CHEST SEAL

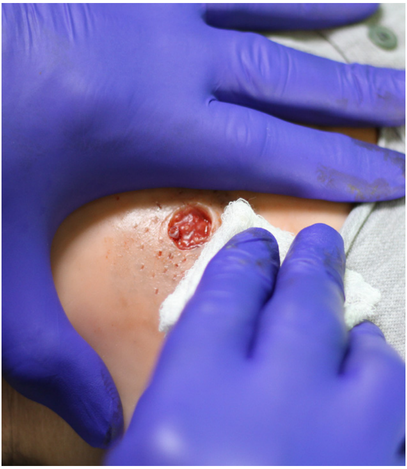
1

- LOCATE WOUND
- EXPOSE WOUND



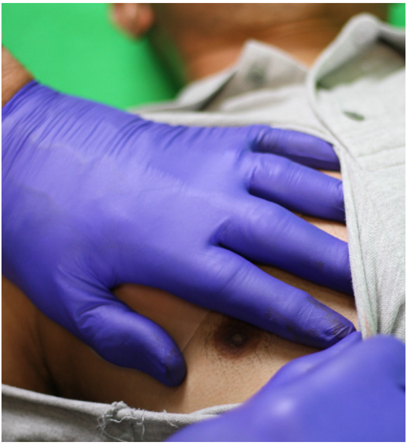
2

- WIPE OR BLOT AWAY EXCESS BLOOD



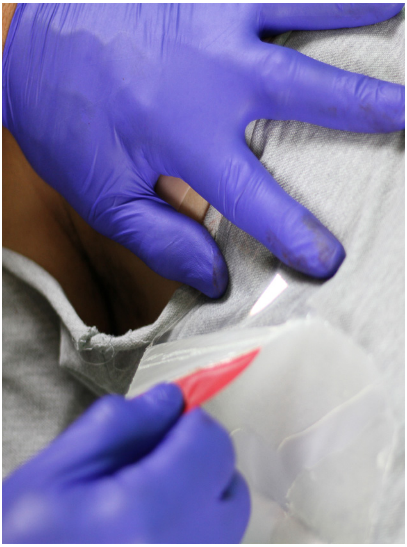
HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

COMMERCIAL CHEST SEAL



3

- COVER WOUND WITH GLOVED HAND



4

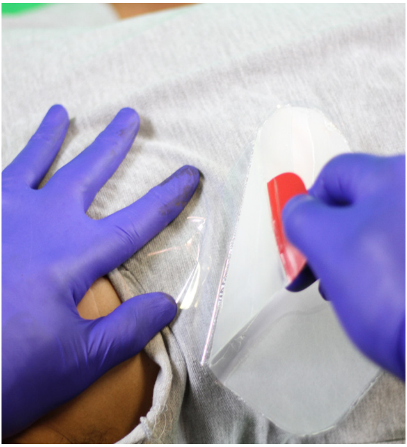
- STILL COVERING WOUND
- OPEN CHEST SEAL

HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

COMMERCIAL CHEST SEAL

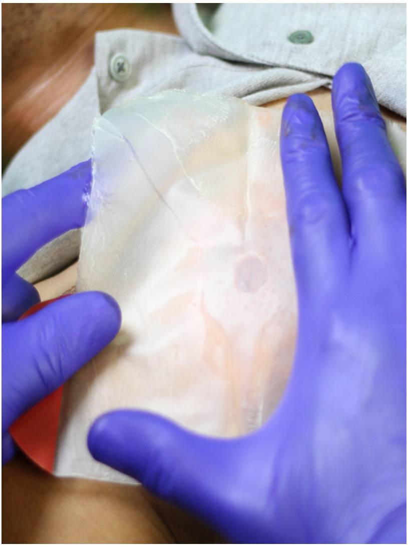
5

- REMOVE BACKING



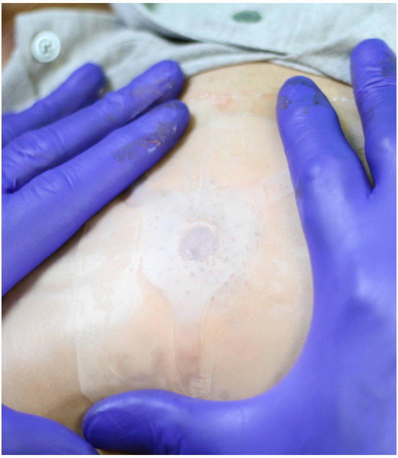
6

- PLACE CHEST SEAL ON VICTIM WITH WOUND CENTERED
- SEAL ALL SIDES



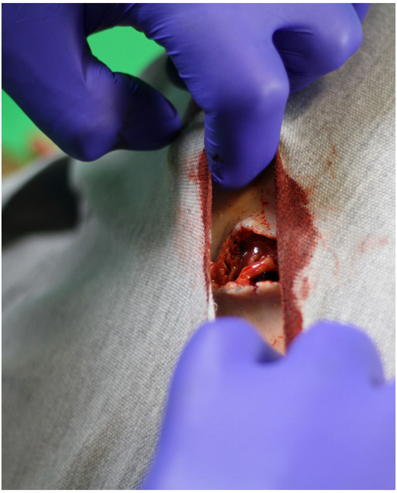
HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

COMMERCIAL CHEST SEAL



7

- COMPLETE SEAL
- CHECK FOR EXIT WOUND, IF ANY



8

- LOCATE EXIT WOUND
- REPEAT ① TO ⑦ TO SEAL EXIT WOUND WITH CHEST SEAL

HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

COMMERCIAL CHEST SEAL

9

- MONITOR VICTIM FOR TENSION PNEUMOTHORAX SEE ⑩
- IF SYMPTOMS DEVELOP, BURP CHEST SEAL SEE PAGE 5-23
- IF NO SYMPTOMS, CONTINUE ASSESSMENT

GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

COMMERCIAL CHEST SEAL

10

DOES VICTIM HAVE SYMPTOMS OF TENSION PNEUMOTHORAX?

You have sealed the chest, and the victim begins to have trouble breathing. Is a tension pneumothorax developing? If the following signs are present, burp the chest seal to relieve the increasing air pressure in the chest.

- **Increased anxiousness**
- **Increased anxiety about being unable to breathe**
- **Gasping for air**
- **Rapid breathing**
- **Complaining of shortness of breath**

If you are not sure, no harm will be done by "burping" the chest seal as long as it is resealed.

Once a tension pneumothorax develops, it will happen again and repeated "burping" of the seal may be necessary.

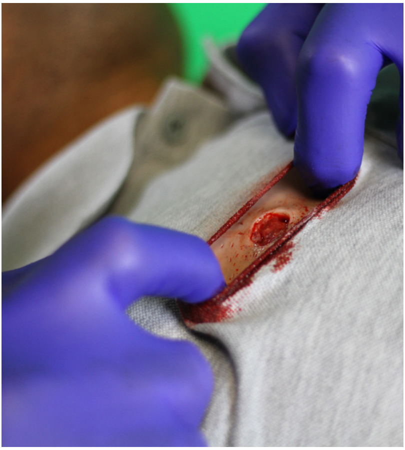
If present, go to "Burping Chest Seal" on Page 5-23.

HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

IMPROVISED CHEST SEAL

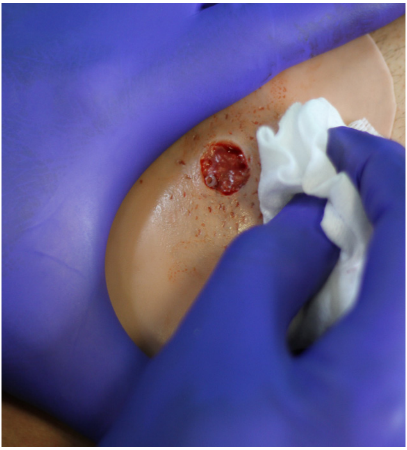
1

- LOCATE WOUND
- EXPOSE WOUND



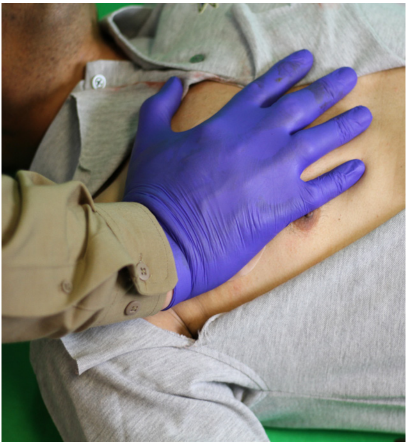
2

- WIPE OR BLOT AWAY EXCESS BLOOD



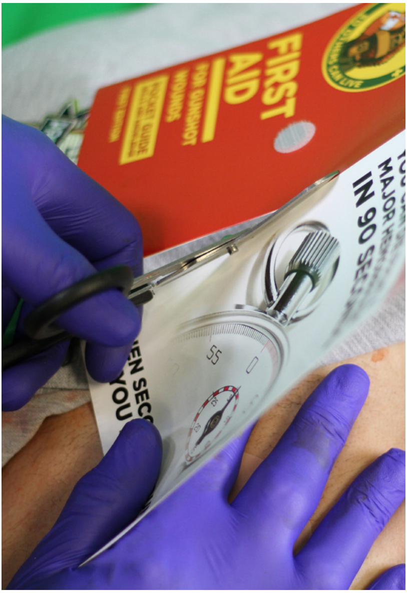
HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

IMPROVISED CHEST SEAL



3

- COVER WOUND WITH GLOVED HAND



4

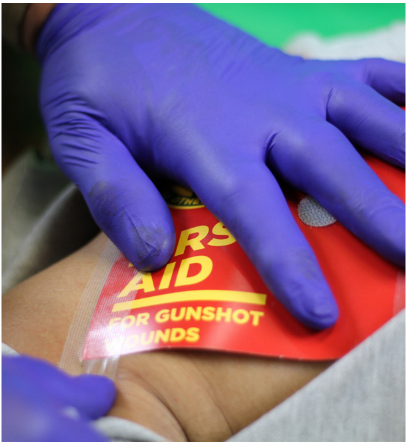
- WHILE STILL COVERING WOUND, MANUFACTURE AN IMPROVISED CHEST SEAL WITH AN AIRTIGHT, WATERTIGHT MATERIAL

HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

IMPROVISED CHEST SEAL

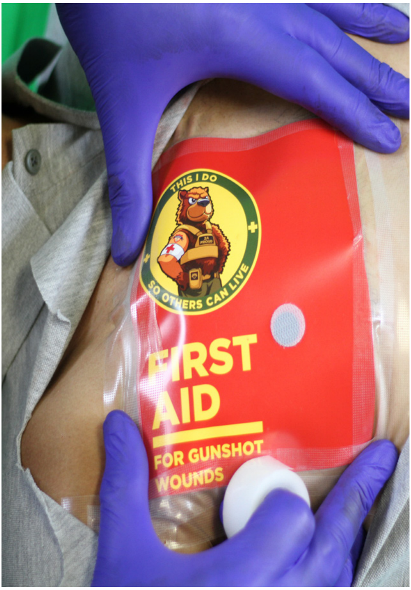
5

- CENTER CHEST SEAL ON VICTIM AND APPLY



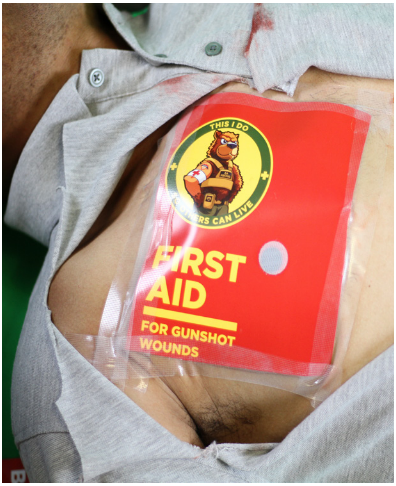
6

- SEAL IMPROVISED CHEST SEAL ON ALL SIDES



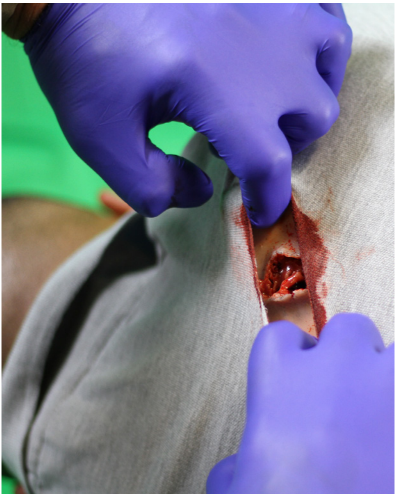
HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

IMPROVISED CHEST SEAL



7

- WHEN ALL SIDES ARE SEALED, CHECK FOR EXIT WOUND, IF ANY



8

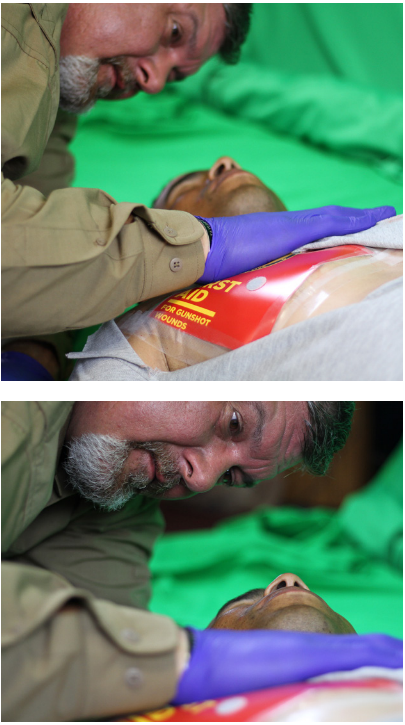
- LOCATE EXIT WOUND
- IF NECESSARY, REPEAT ① TO ⑦ TO SEAL EXIT WOUND WITH IMPROVISED CHEST SEAL

HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

IMPROVISED CHEST SEAL

9

- MONITOR VICTIM FOR TENSION PNEUMOTHORAX SEE ⑩
- IF SYMPTOMS DEVELOP, BURP CHEST SEAL SEE PAGE 5-23
- IF NO SYMPTOMS, CONTINUE ASSESSMENT



GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

IMPROVISED CHEST SEAL

10

DOES VICTIM HAVE SYMPTOMS OF TENSION PNEUMOTHORAX?

You have sealed the chest, and the victim begins to have trouble breathing. Is a tension pneumothorax developing? If the following signs are present, burp the chest seal to relieve the increasing air pressure in the chest.

- Increased anxiousness
- Increased anxiety about being unable to breathe
- Gasping for air
- Rapid breathing
- Complaining of shortness of breath

If you are not sure, no harm will be done by “burping” the chest seal as long as it is resealed.

Once a tension pneumothorax develops, it will happen again and repeated “burping” of the seal may be necessary.

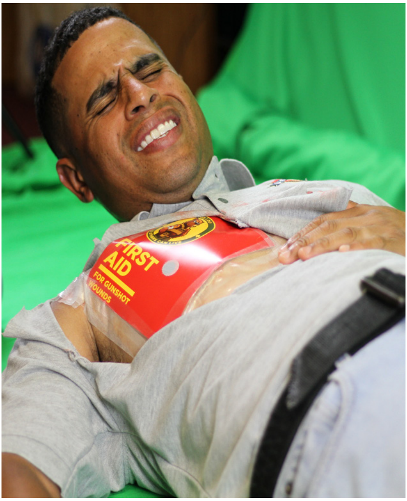
If present, go to “Burping Chest Seal” on Page 5-23.

HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

BURPING CHEST SEAL

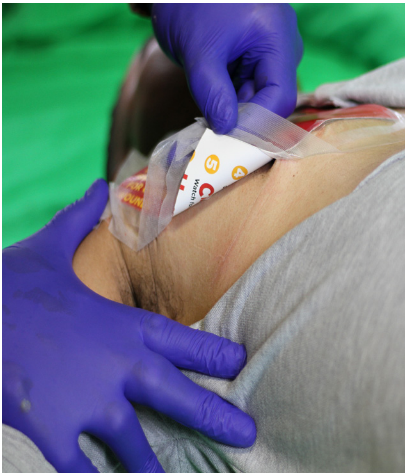
①

- SYMPTOMS OF TENSION PNEUMOTHORAX PRESENT? (SEE PAGE 5-22)
- IF YES, GO TO ② AND BURP CHEST SEAL



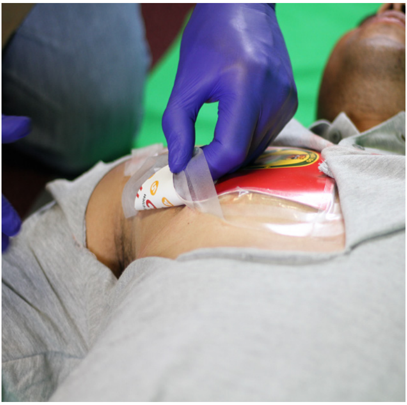
②

- LIFT SECTION OF CHEST SEAL
- CREATE OPEN PATHWAY TO WOUND
- ALLOW PRESSURIZED AIR TO ESCAPE



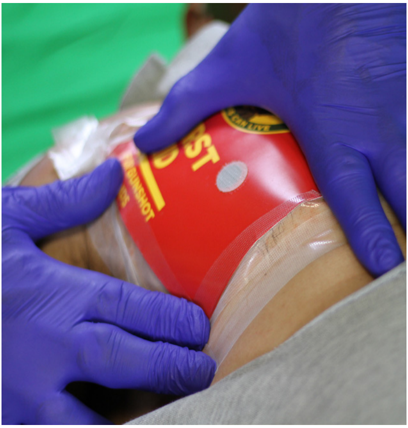
HOW TO TREAT A GUNSHOT WOUND TO THE CHEST

BURPING CHEST SEAL



3

- KEEP PATHWAY OPEN FOR PRESSURIZED AIR TO ESCAPE UNTIL BREATHING IMPROVES



4

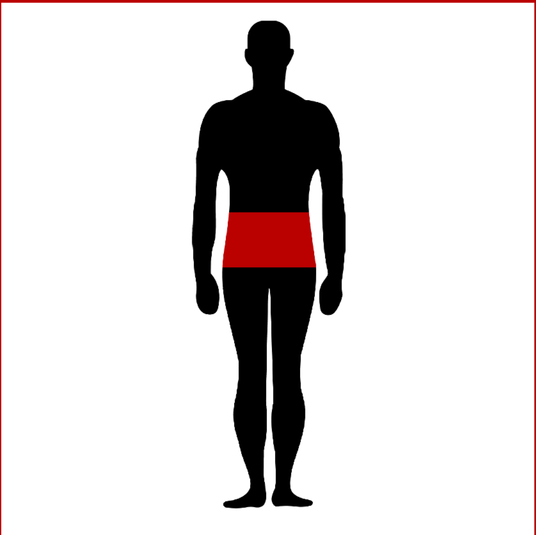
- WHEN BREATHING IMPROVES, RESEAL CHEST
- REPEAT BURPING IF SYMPTOMS REAPPEAR

GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

FIRST AID FOR

GUNSHOT WOUND ABDOMEN



GUNSHOT WOUND ABDOMEN

S.M.A.R.C.H.R.™

- ✓ **SAFETY**
  - SECURITY
  - 911
- ✓ **PERSONAL PROTECTION EQUIPMENT**
- ✓ **ALL MASSIVE HEMORRHAGE UNDER CONTROL**
- ✓ **CLEAR AIRWAY**
- ✓ **SEAL CHEST WOUNDS**

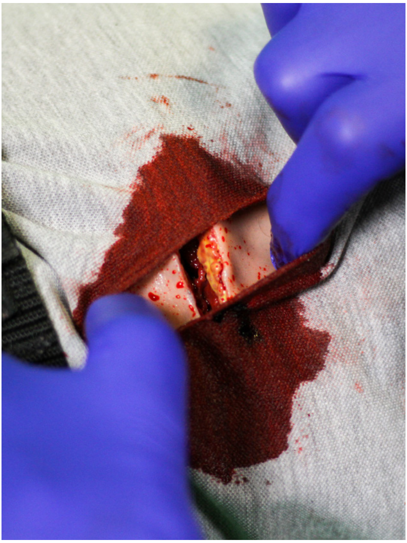
GO

HOW TO TREAT A GUNSHOT WOUND

TO THE ABDOMEN

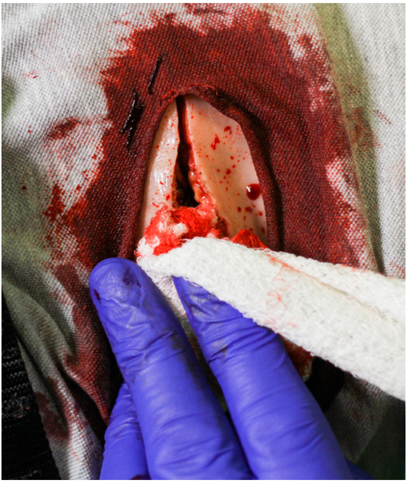
1

- LOCATE AND EXPOSE WOUND
- EVISCERATION?
- IF YES, GO TO PAGE 5-30
- IF NO, GO TO ②



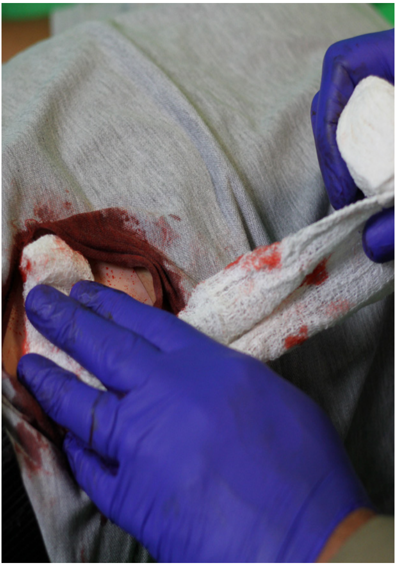
2

- APPLY DRESSING
- HOLD DIRECT PRESSURE ON DRESSING



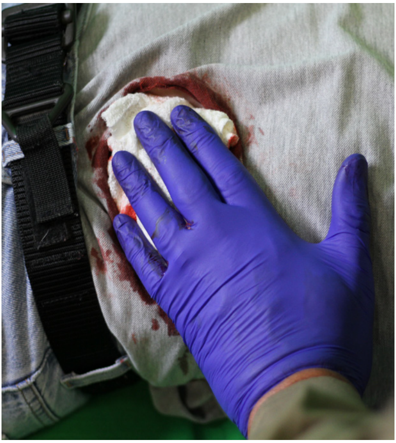
HOW TO TREAT A GUNSHOT WOUND

TO THE ABDOMEN



3

- KEEP CONSTANT PRESSURE ON DRESSING
- ADD NEW GAUZE ON TOP OF BLOOD SOAKED GAUZE AS NECESSARY



4

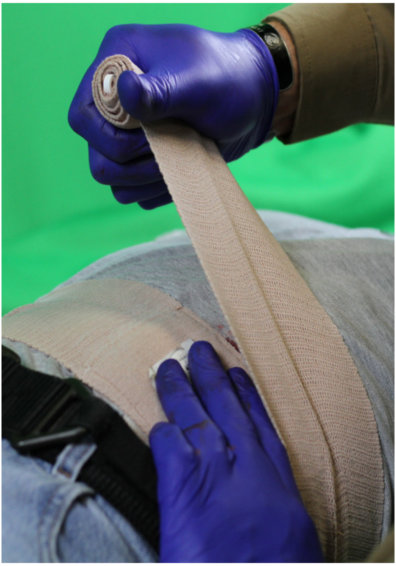
- WHEN BLEEDING STOPS, APPLY BANDAGE TO DRESSING

HOW TO TREAT A GUNSHOT WOUND

TO THE ABDOMEN

5

- WRAP AND SECURE BANDAGE TO KEEP CONSTANT PRESSURE
- CHECK FOR OTHER BLEEDING

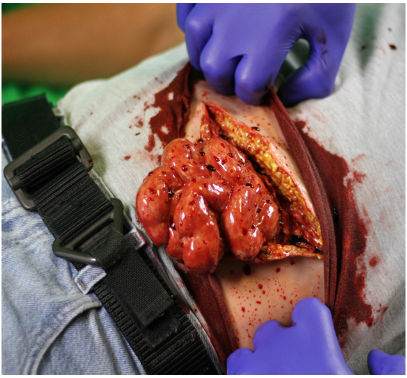


GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

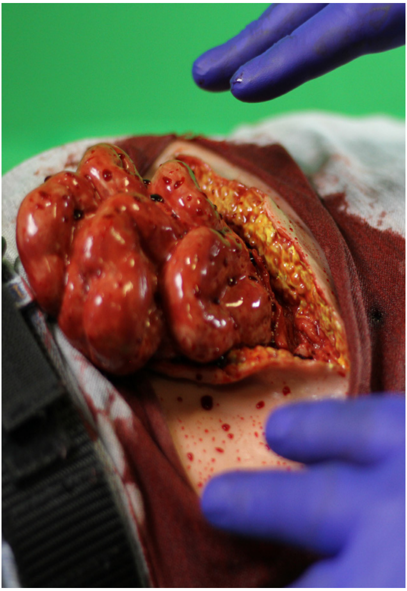
HOW TO TREAT A GUNSHOT WOUND TO THE ABDOMEN WITH EVISCERATION

REDUCTION OR COVERING?



1

- EXPOSE WOUND AND ANY PROTRUDING ABDOMINAL CONTENTS



2

- ARE YOU COMFORTABLE PUSHING ORGANS BACK INSIDE THE BODY?
- IF YES, GO TO ③ ORGAN REDUCTION
- IF NO, GO TO ⑦ COVERING METHOD

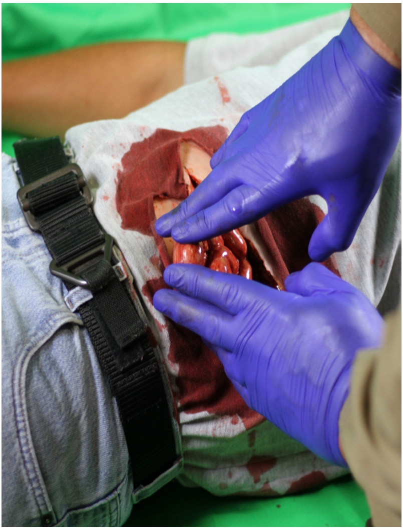
HOW TO TREAT A GUNSHOT WOUND TO THE ABDOMEN WITH EVISCERATION

ORGAN REDUCTION

3

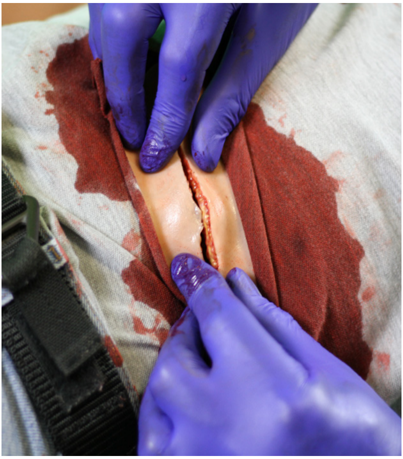
ORGAN REDUCTION

- GENTLY PUSH ORGANS BACK INTO BODY CAVITY
- AVOID PINCHING OR TWISTING



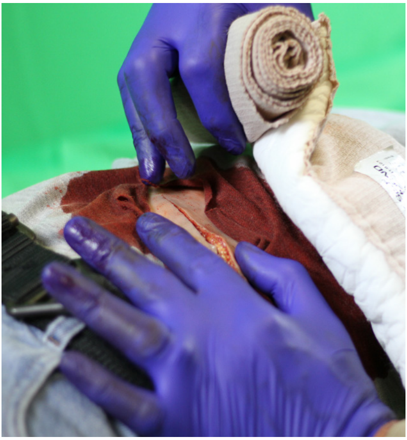
4

- ONCE ORGANS ARE INSIDE SKIN, CLOSE EDGES OF WOUND



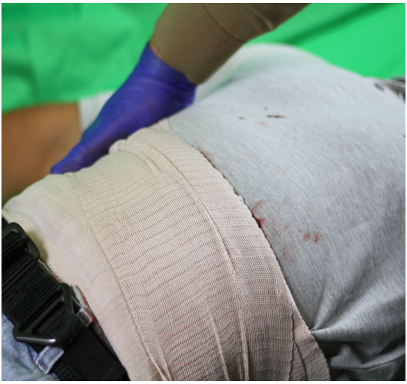
HOW TO TREAT A GUNSHOT WOUND TO THE ABDOMEN WITH EVISCERATION

ORGAN REDUCTION



5

- APPLY PRESSURE DRESSING OVER WOUND



6

- WRAP AND SECURE DRESSING
- CONTINUE WITH BLOOD SWEEP

GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

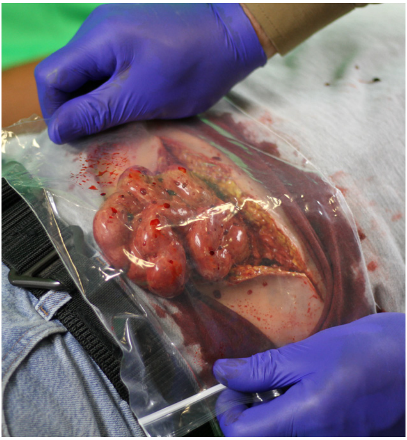
HOW TO TREAT A GUNSHOT WOUND TO THE ABDOMEN WITH EVISCERATION

COVERING METHOD

⑦

COVERING METHOD

- USE AN AIRTIGHT COVERING TO KEEP ORGANS MOIST

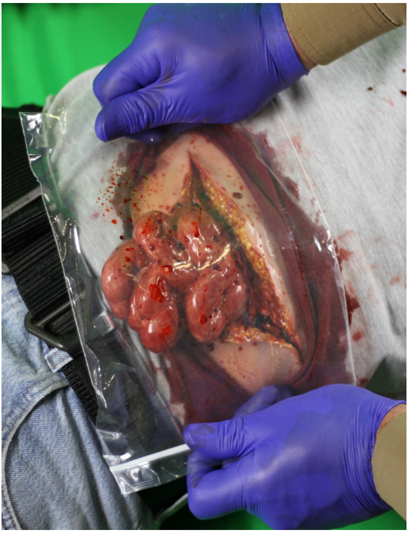


⑧

- IS ABDOMINAL TRAUMA DRESSING AVAILABLE?

- IF YES, GO TO ⑬

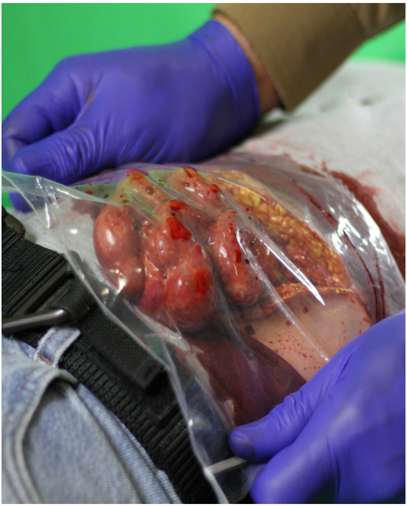
- IF NO, GO TO ⑨



HOW TO TREAT A GUNSHOT WOUND TO THE ABDOMEN

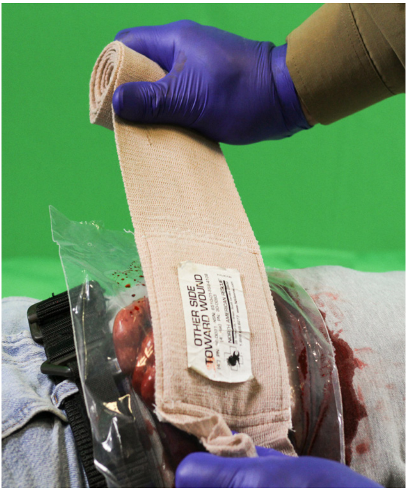
EVISCERATION

COVERING METHOD



9

- PLACE AIRTIGHT COVERING (SUCH AS PLASTIC WRAP) OVER ORGANS
- COMPLETELY COVER



10

- GENTLY COVER AIRTIGHT COVERING WITH DRESSING
- NO PRESSURE

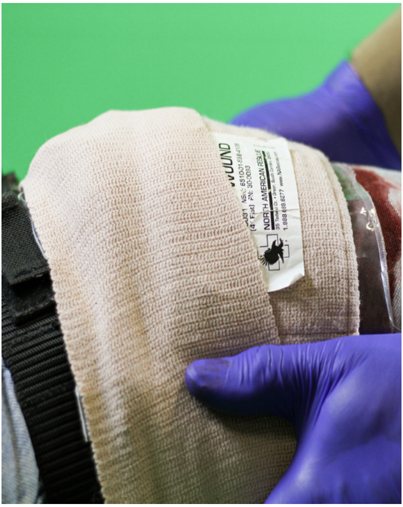
HOW TO TREAT A GUNSHOT WOUND TO THE ABDOMEN

EVISCERATION

COVERING METHOD

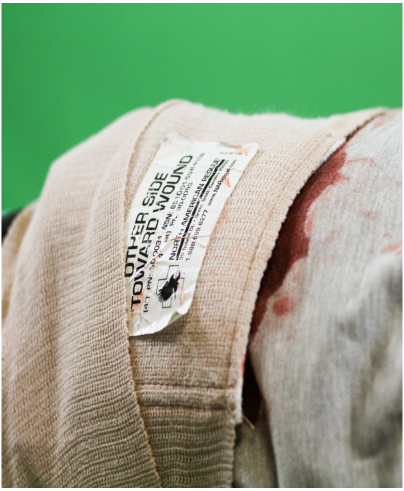
11

- LOOSELY APPLY BANDAGE TO KEEP DRESSING IN PLACE



12

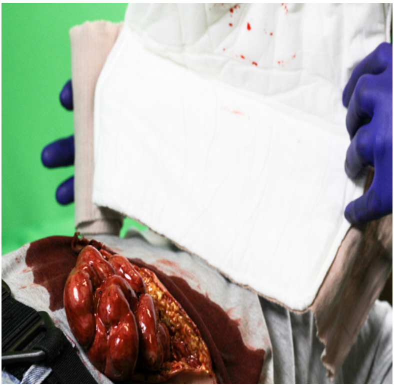
- WRAP AND SECURE BANDAGE
- CONTINUE WITH BLOOD SWEEP

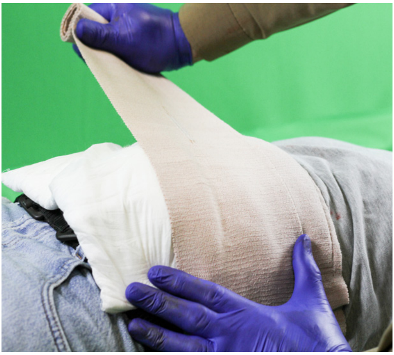


HOW TO TREAT A GUNSHOT WOUND TO THE ABDOMEN

EVISCERATION

COVERING METHOD





13

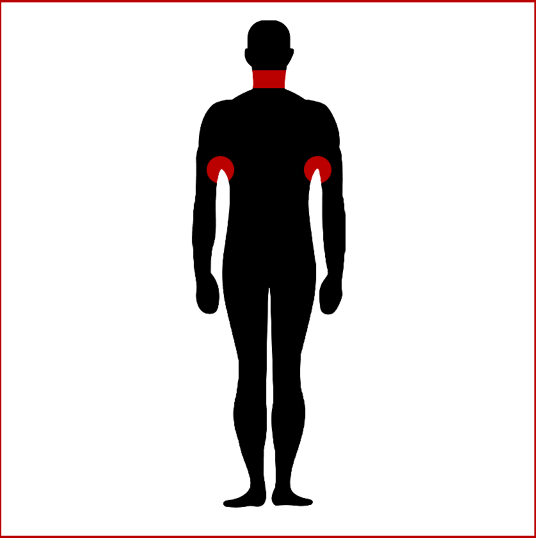
- PLACE ABDOMINAL TRAUMA DRESSING OVER ORGANS
- WRAP AND SECURE BANDAGE
- CONTINUE WITH BLOOD SWEEP

GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

FIRST AID FOR

GUNSHOT WOUND NECK OR ARMPIT



GUNSHOT WOUND
NECK OR ARMPIT

S.M.A.R.C.H.R.™

GSW NECK/ARMPIT

- ✓ **SAFETY**
  - **SECURITY**
  - **911**
- ✓ **PERSONAL PROTECTION EQUIPMENT**
- ✓ **ALL MASSIVE HEMORRHAGE UNDER CONTROL**
- ✓ **CLEAR AIRWAY**
- ✓ **SEAL CHEST WOUNDS**

GO

HOW TO TREAT A GUNSHOT WOUND

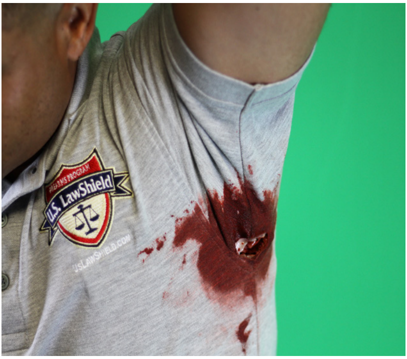
TO THE NECK OR ARMPIT

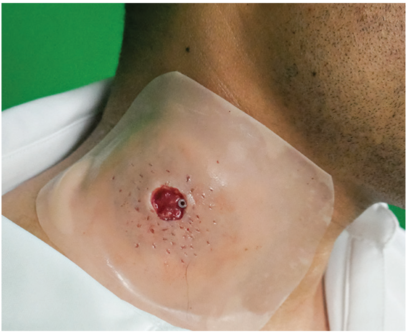
WOUND PACKING

Neck and armpit wounds use the same packing/dressing technique, except the bandage on the trauma dressing starts at the neck or at the armpit.

1

- BRIGHT-RED, SQUIRTING OR POOLING BLOOD?
- IF YES, GO TO ②
- IF NO, CONTINUE S.M.A.R.C.H.R.™

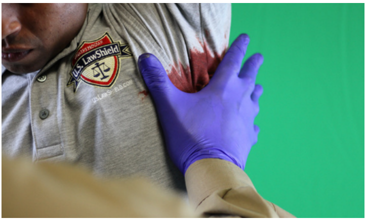


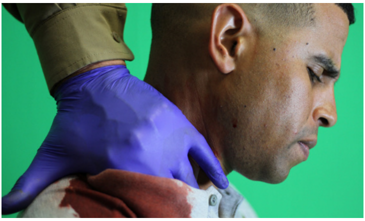


HOW TO TREAT A GUNSHOT WOUND

TO THE NECK OR ARMPIT

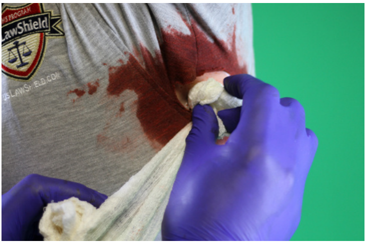
WOUND PACKING

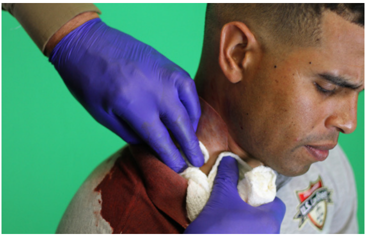




2

- EXPOSE WOUND
- APPLY DIRECT PRESSURE TO WOUND





3

- PACK WOUND WITH GAUZE
- FOR NECK INJURIES, *DO NOT* PRESS ON TRACHEA (WINDPIPE) OR BLOCK AIRWAY

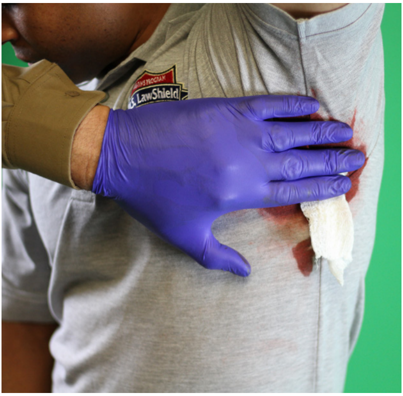
HOW TO TREAT A GUNSHOT WOUND

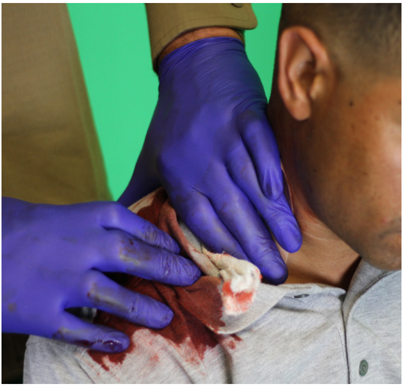
TO THE NECK OR ARMPIT

WOUND PACKING

4

- HEMOSTATIC GAUZE: APPLY PRESSURE FOR A MINIMUM OF 3 MINUTES
- REGULAR GAUZE: APPLY PRESSURE UNTIL BLEEDING STOPS

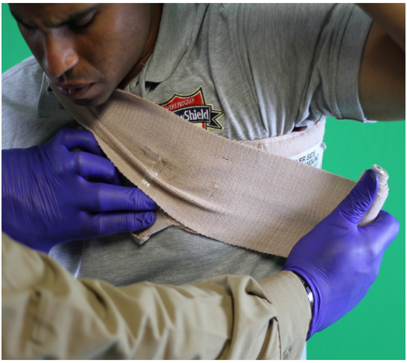


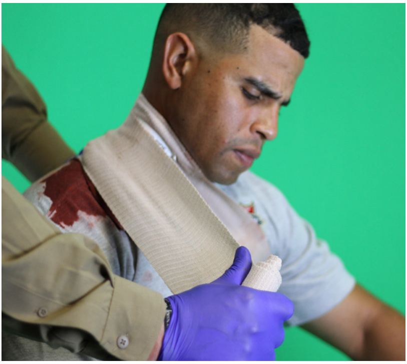


HOW TO TREAT A GUNSHOT WOUND

TO THE NECK OR ARMPIT

WOUND PACKING





5

- WHEN BLEEDING STOPS, APPLY THE TRAUMA DRESSING, STARTING WITH DRESSING OVER WOUND

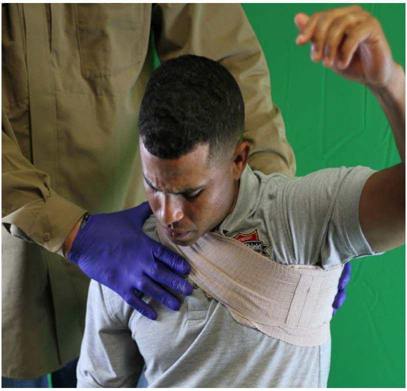
HOW TO TREAT A GUNSHOT WOUND

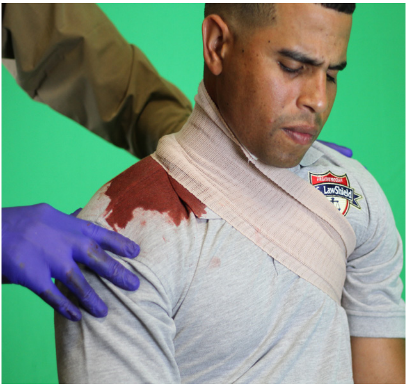
TO THE NECK OR ARMPIT

WOUND PACKING

⑥

- FOR BOTH TYPES OF WOUNDS, THE DRESSING STARTS AT THE WOUND, AS SHOWN IN ⑤ AND WRAPS AROUND NECK AND ARMPIT UNTIL SECURED
- CONTINUE WITH BLOOD SWEEP



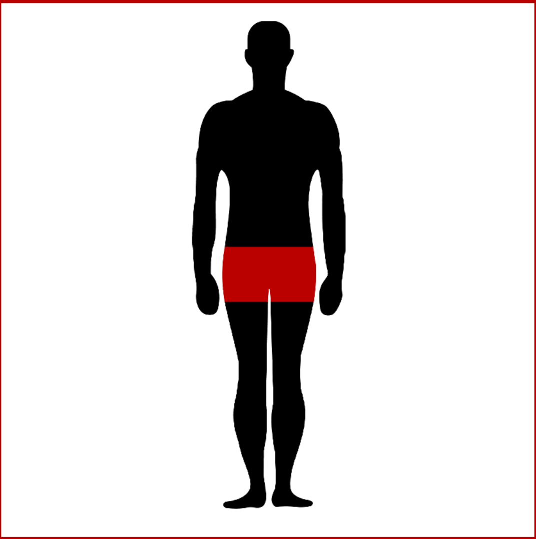


GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

FIRST AID FOR

GUNSHOT WOUND GROIN



GUNSHOT WOUND
GROIN

S.M.A.R.C.H.R.™

- ✓ **SAFETY**
  - SECURITY
  - 911
- ✓ **PERSONAL PROTECTION EQUIPMENT**
- ✓ **ALL MASSIVE HEMORRHAGE UNDER CONTROL**
- ✓ **CLEAR AIRWAY**
- ✓ **SEAL CHEST WOUNDS**

GO

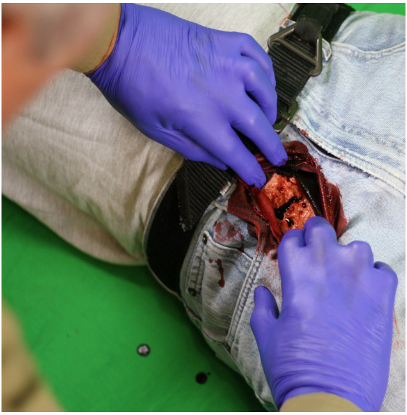
HOW TO TREAT A GUNSHOT WOUND

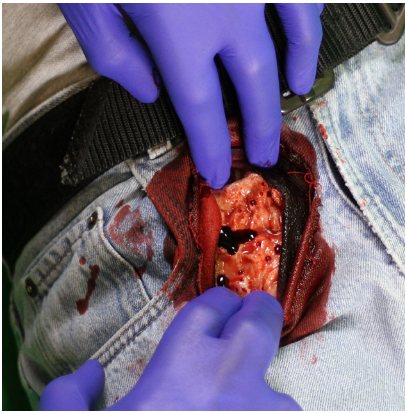
TO THE GROIN

WOUND PACKING

①

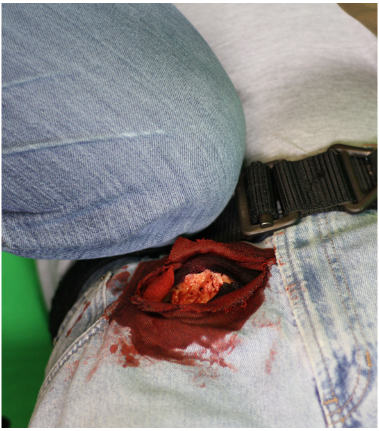
- BRIGHT-RED, SQUIRTING OR POOLING BLOOD AND CAN TOURNIQUET BE APPLIED?
- IF YES: GO TO PAGE 5-1
- IF NO: GO TO ②





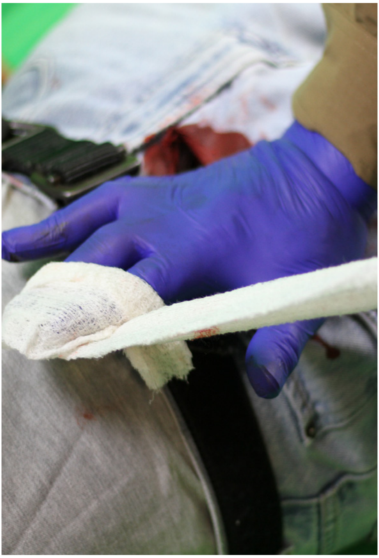
HOW TO TREAT A GUNSHOT WOUND

TO THE GROIN WOUND PACKING



2

- APPLY DIRECT PRESSURE TO PRESSURE POINT
- EXPOSE WOUND



3

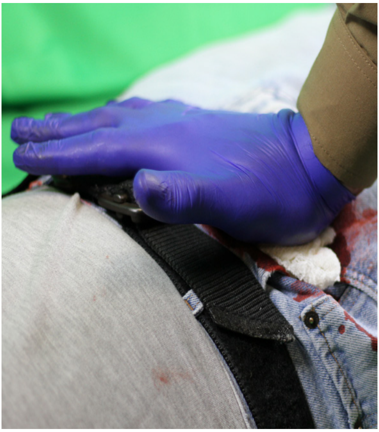
- KEEP DIRECT PRESSURE ON WOUND
- PREPARE GAUZE TO PACK WOUND

HOW TO TREAT A GUNSHOT WOUND

TO THE GROIN WOUND PACKING

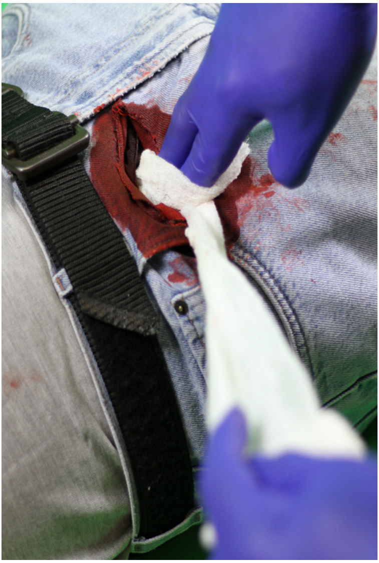
4

- PACK GAUZE IN WOUND
- PACK TO BONE



5

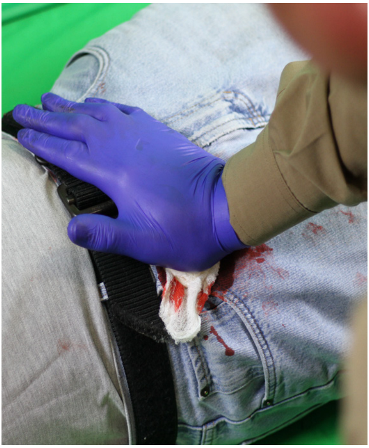
- PACK WOUND CAVITY WITH GAUZE
- APPLY NEW GAUZE ON TOP OF OLD — DO NOT REMOVE OLD GAUZE!



HOW TO TREAT A GUNSHOT WOUND

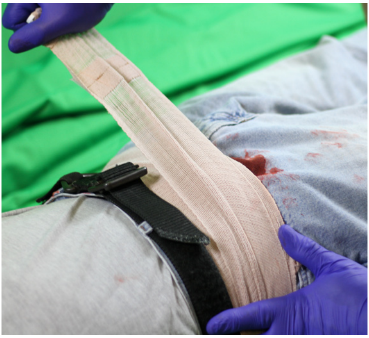
TO THE GROIN

WOUND PACKING



6

- HEMOSTATIC GAUZE: APPLY PRESSURE FOR A MINIMUM OF 3 MINUTES
- REGULAR GAUZE: APPLY PRESSURE UNTIL BLEEDING STOPS



7

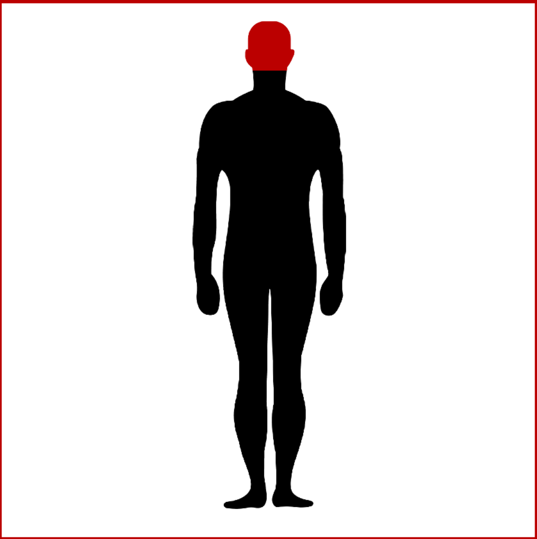
- APPLY THE TRAUMA DRESSING
- CONTINUE BLOOD SWEEP

GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

FIRST AID FOR

GUNSHOT WOUND HEAD



GSW HEAD

GUNSHOT WOUND
HEAD

S.M.A.R.C.H.R.™

- ✓ **SAFETY**
  - SECURITY
  - 911
- ✓ **PERSONAL PROTECTION EQUIPMENT**

GO

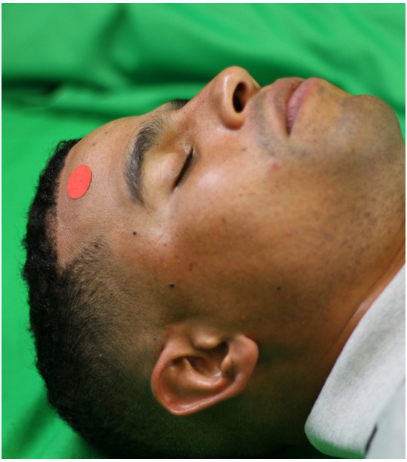
GSW HEAD

HOW TO TREAT A GUNSHOT WOUND

TO THE HEAD

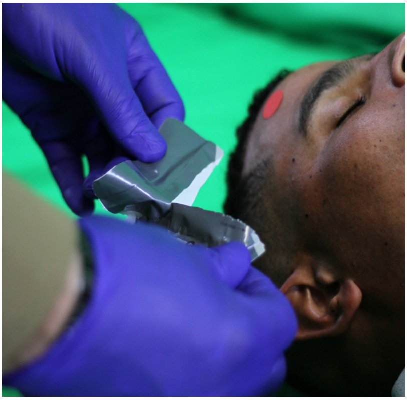
1

- LOCATE GUNSHOT WOUND TO THE HEAD
- BANDAGE
- DO NOT PACK WOUND
- DO NOT USE HEMOSTATIC AGENTS



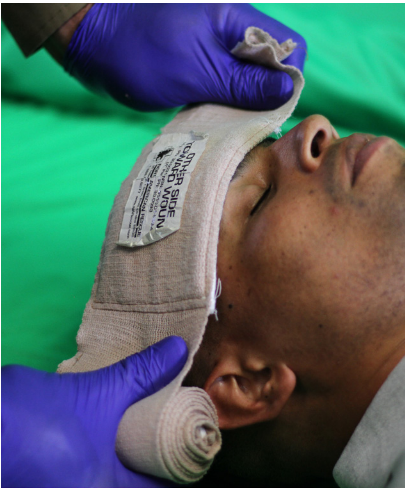
2

- REMOVE BANDAGE FROM PACKAGING



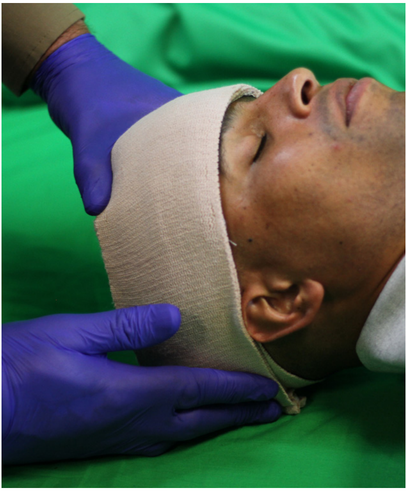
HOW TO TREAT A GUNSHOT WOUND

TO THE HEAD



3

- GENTLY APPLY BANDAGE, STERILE SIDE DOWN, TO WOUND



4

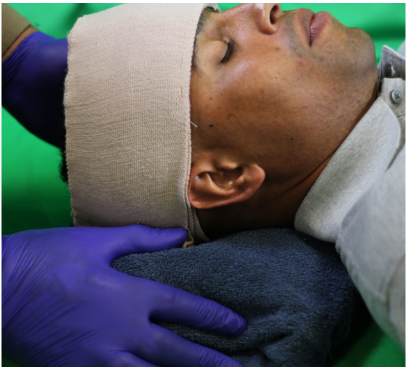
- GENTLY WRAP AND SECURE BANDAGE

HOW TO TREAT A GUNSHOT WOUND

TO THE HEAD

5

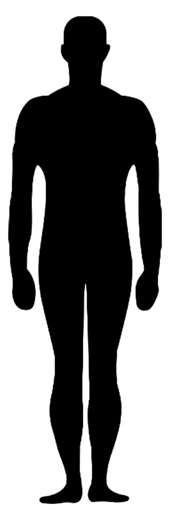
- ELEVATE THE HEAD
- CONTINUE WITH BLOOD SWEEP



GO

- CONTINUE WITH S.M.A.R.C.H.R.™ ON 5-58

S.M.A.R.C.H.R.™



S.M.A.R.C.H.R.™

5-57

GUNSHOT WOUNDS STEPS TO SAVE LIFE

1. **SECURITY/SAFETY**
   Assess the scene and make it safe

2. **MASSIVE HEMORRHAGE**
   Stop the bleed

3. **AIRWAY**
   Clear and unobstructed

4. **RESPIRATIONS**
   Quality & respiratory rate

5. **CIRCULATION**
   Watch for shock and bandage wounds

6. **HYPOTHERMIA**
   Keep warm

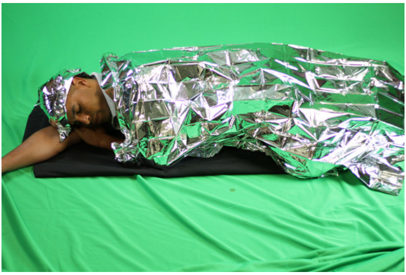
7. **RECOVERY POSITION**
   Maximize breathing and prevent aspiration

HOW TO TREAT A GUNSHOT WOUND

SPECIAL NOTE:
PREVENTING HYPOTHERMIA

1

- PLACE INSULATION MATERIAL (CLOTHES, NEWSPAPER, CARDBOARD, ETC.) BETWEEN PATIENT AND GROUND
- COVER HEAD
- WRAP PATIENT IN BLANKETS, CLOTHES, ETC.

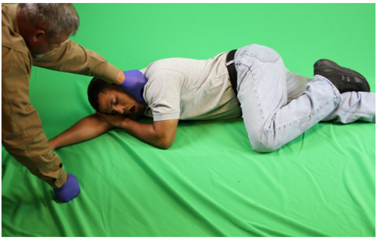


GO

- CONTINUE WITH RECOVERY POSITION ON 5-60

HOW TO TREAT A GUNSHOT WOUND

SPECIAL NOTE: RECOVERY POSITION



①

- PLACE VICTIM ON SIDE
- THREE-QUARTERS PRONE POSITION
- TUCK HAND UNDER HEAD
- BEND KNEE AT RIGHT ANGLE
- BOTTOM ARM SUPPORTS HEAD
- OPEN AIRWAY
- MONITOR UNTIL HELP ARRIVES

GO

- CONTINUE WITH REASSESSMENT CHECKLIST ON 5-61

HOW TO TREAT A GUNSHOT WOUND

REASSESSMENT CHECKLIST

REASSESSMENT CHECKLIST

- ✓ Check **M**assive Bleeds
  - ☐ Tourniquets
  - ☐ Wound packing
- ✓ Check **A**irways
  - ☐ Airway
- ✓ Check **R**espirations
  - ☐ Chest seals
  - ☐ Tension pneumothorax developing?
- ✓ Check **C**irculation
  - ☐ Blood Sweep
  - ☐ Treat additional wounds
- ✓ Check **H**ypothermia
  - ☐ Keep victim warm
- ✓ Check **R**ecovery Position

Reassess S.M.A.R.C.H.R.™